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# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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*A CW Special Report On Choosing the Right Mini*
Follows Page 56

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# Detroit Layoffs Threaten DP Jobs

By Ann Dooley
CW Staff

DETROIT — Computer professionals are "running a little bit scared" in this city where the automobile is king, as layoffs slice into DP jobs right along with those of hourly assembly line workers.

To computer professionals whose positions have been relatively secure over the years, because of their short supply, this new vulnerability comes as an ironic joke.

Rumors abound about when and where the next layoffs will occur, but few specifics could be obtained last week since no automakers would comment.

No information could be obtained concerning the number of DP people affected, but individuals in at least several departments within each of the auto manufacturers' information processing functions have been cut, sources said.

Five out of 21 DP people at one of Chrysler Corp.'s systems software groups were reportedly laid off last month. And at Ford Motor Co., an undisclosed number of DP staff members are slated to get the axe in the next few weeks, according to industry sources.

Layoffs are based on department and not necessarily on seniority so that programmer trainees in one department may remain untouched while several programmers in another area are laid off, an industry observer noted.

### Trend Admitted

Ford noted that DP layoffs have occured primarily in its American automotive operations plants — "the number of people [laid off] is consistent with the status of other functions in the company," Mayford Roark, executive director of Ford's systems, stated.

General Motors indicated that a 10% salary reduction across the board is in effect and that each department is handling the cost cutting differently.

At Chrysler Corp. — hardest hit of the three — layoffs have taken place for some time among white-collar personnel. Some functions have been combined and overtime has been eliminated. Cutbacks have occurred by plant or facility and not by operation so, although no figures are available, "it is safe to say the computer area did not go unscathed," a Chrysler spokesman stated.

All three indicated that their budgets are adjusted to the present conditions and noted that overtime, new hiring, equipment purchases and system development will continue to "reflect the overall business."

Computer professionals laid off have few real worries, however, since they are being snapped up by other industries in the area or are moving to other parts of the country. Few will face long months of unemployment, according to Thomas Hing, DP personnel consultant for Robert Half of Detroit, Inc., a personnel agency.

The auto companies previously had their pick of computer people, frequently hiring new graduates each year. These mainly out-of-town people are the ones migrating to the West Coast or to Houston, currently the DP hot spot, because of the computer needs of the oil industry, Hing noted.

Volkswagen of America, Inc. — not hit as hard as the American car manufacturers — is also campaigning to attract those laid off, he noted.

# EPA Confirms Carcinogen In IBM 3800 Laser Printer

By Ann Dooley
CW Staff

WASHINGTON, D.C. — Tests by the Environmental Protection Agency (EPA) have confirmed that a chemical used in the IBM 3800 laser printer is a carcinogen.

The chemical — trinitrofluorenone (TNF) — induced gene mutations in bacterial and animal cells in laboratory experiments, but whether it is harmful to humans is still unknown, according to the results of a preliminary evaluation.

The agency has requested further data from IBM before making recommendations on the chemical's continued use. The data requested relates to how much TNF is found in the air around an operating printer, how much chemical remains on the paper with the toner, whether TNF reacts with other chemicals and what happens to the spent toner after it is removed from the photoconductor.

This information will help to "better determine the nature and the extent of any possible risks of injury to human health due to exposure of TNF," the EPA stated.

The mutagenic effects of TNF were found to be dose related in the culture experiments and were "sensitizing and irritating to the skin of lab animals." But the potential for cancer and tumor-causing results demonstrated in the lab do not necessarily relate to human use, an EPA spokesman said.

TNF is also used in the IBM Copier I and Copier II in addition to the 3800 printer and is found on the mylar substrate of the equipment's photoconductor. Trace amounts of the chemical can remain on the output copy.

The EPA did not suggest, however, that people from using the equipment.

IBM, which has 20 days to respond to the EPA's request, has indicated that although it plans to cooperate fully with the EPA, it will not recommend any change in equipment use to its customers and does not consider TNF a danger to humans.

The chemical was called into question earlier this year after results from IBM testing showed the possibility of a health hazard stemming from the chemical [CW, June 9].

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**Dear Miss Fortune:** No. There are a number of "gigolo" sort programs around today looking for a life of ease and luxury in a rich computer center. The only exception I know is SyncSort OS, which has been earning its living since the age of one. This program will never squander your resources, since it uses 15% to 50% less CPU Time, Elapsed Time and SIOs than any other sort on the circuit today. In addition, SyncSort is very faithful. It never interferes with non-sorts in the mix.

• • •

**Dear Dr. SyncSort:** One of the things I have always hated about sorting is all the coding, compiling and debugging that is necessary with most programs. Is there any way I can reduce this mind-numbing drudgery? **Hates Housework.**

**Dear Hates Housework:** Yes, get SyncSort OS. It is loaded with labor-saving features like INCLUDE/OMIT, SUM, INREC/OUTREC, MAXSORT, and slick new straight-copy facility called BETTERGENER. Once you begin using SyncSort, feeling will return to your mind almost immediately.

• • •

**Dear Dr. SyncSort:** A few months ago I was swept off my feet by a handsome, suave representative of a large hardware company. Under the influence of moonlight and roses, I accepted the sort program which he slipped into my fingers. But once the contract was signed, he became very cold toward me. Now, when I try to discuss sorting problems with him, he says, "Why can't you ever talk about anything interesting—like a new and larger computer?" **Repenting at Leisure.**

**Dear Repenting:** We receive many heartbreaking letters of this type. You may have to face up to the fact that a happy sort divorce is preferable to a miserable sort union.

• • •

**Dear Dr. Syncsort:** Help! I am being driven mad by a telephone problem. Every time I call the large company that makes my sort program for help on a problem, I get the run around. Either the phone rings itself off the wall, or I get somebody who specializes in hardware. Is there any number I can call where I can get expert advice on **sorting** problems? **Ringy-Dingy.**

**Dear Ringy-Dingy:** Yes, call Whitlow. They don't make hardware. All they make is sort programs. The number is (201) 568-9700.

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# Division of 250 Employees Found Typical MIS Profile

By Bruce Heard
CW Staff

WALTHAM, Mass. — Although organizations vary from firm to firm, the typical MIS division in a large company employs about 250 people in three basic functional categories: operations; systems development and programming; and support (see accompanying pie chart).

Those results were found by a recent study conducted by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group. The study is part of a long-range program to identify ways to optimize human resources within MIS.

Surveys were taken at 131 large computer sites and interviews were held with senior MIS management personnel to research the study, "MIS Organizational Structures and Career Paths."

Operations composes 40.2% of a "typical" MIS division and is itself made up of computer operations and data entry. Systems development and programming comprises an additional 39.1% and may be further broken down into programmers, analysts and managers. Support functions account for the final 20.7% — roughly divided between systems programming and "other."

As the "other" label indicates, the support category is somewhat "residual" in nature and may be subsumed within the operations and systems development and programming categories, according to the study.

### Category Orientations

Operations is primarily concerned with applications systems that are up and running in a production mode. Headquartered in the computer room, it includes the preparation of input data and the handling and dispersal of output.

While the advent of distributed data processing has diluted the tendency to centralize data entry within operations, it is still reponsible for a certain amount, usually for smaller applications.

Operations objectives run from minimizing downtime and timely production and distribution of outpot, to avoidance of input and operational errors and minimizing costs.

Whereas operations is process-oriented, systems development and programming tend to be project-oriented. "It is concerned with the design, development and implementation of new computer application systems as well as the maintenance and enhancement of existing systems," according to the study.

This project-orientation "results in the definition of near-term objectives in terms of the delivery of computer systems which meet specified performance requirements, on time and within budget." Program maintenance is also specified in terms of short-term projects.

### Support Functions

As mentioned, support functions may fall through the cracks and end up as part of another category. The study defined support as "everything which is not directly related to the two functions previously specified," and listed the following:

- Operating systems (systems control program) programming.
- DP planning.
- Education.
- Performance evaluation and tuning.
- Standards.
- Quality assurance.
- Other support functions.

The study made it a point to distinguish support functions from operations and systems and development programming to maintain a perspective of their particular characteristics.

When support functions are subsumed, it is usually within a small MIS division, as in the case of Figure 1 below. The basic two-part division, as depicted in Figure 1 may also be found in larger shops and tends to contain a "structural bias" toward an "undervaluation or neglect" of the support functions, according to the study.

Figure 2 on Page 5 reintroduces support, but on a tentative basis, the study noted, adding that its components may be dispersed at random and rarely find their way to operations and system development and programming in even numbers.

### Position of Staff

Figure 3 below and Figure 4 on Page 5 are characterized by the emergence of a third entity — the staff. It reports to the MIS director and may infrequently include some of the support functions.

"A typical [Figure 3] organization may have, for example, DP planning and standards and staff to the MIS director, while a production technical support group will be located in operations, and systems programming and education will be in systems development and programming," the study explained.

Although nearly all MIS divisions are constituted of one of the organizations described here, their implementation may be widely divergent.

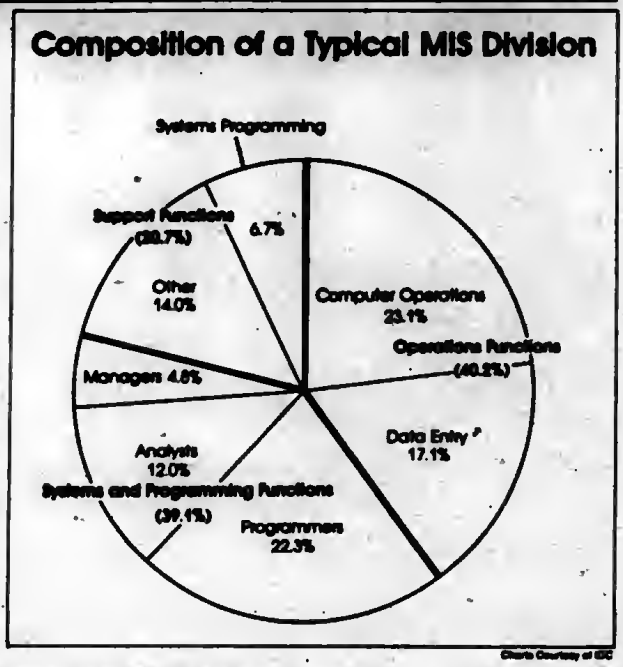
The third functional area in type 3 and 4 organizations may be implemented as two or more separate organizational units reporting to the MIS director. "In such situations, the distinction between it and purely staff implementations may blur," the study notes.

"Similarly, the systems and programming function may be implemented as two or three separate units divided by application areas," it continued. This changes the internal stucture of one of the basic organizational divisions of the MIS department from internal to external.

"That is, what is represented as one organizational unit is split into several."

The report, No. 2073, is available for $4,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

Next week: Different career paths.



Charts Courtesy of IDC

# Management Participation Critical to MIS

(Continued from Page 1)

more sophisticated. MIS directors now frequently report directly to chief executive officers, as opposed to financial or operations officers, whose departments were formerly the most dependent on computers, the study noted.

Although the study cited a tendency by some chief executive officers to "compartmentalize" computers within operations or finance, the overall trend is now toward "properly managing" information resources, the study reported. This trend will gain strength as top executives become more familiar with, and gain more confidence in, their computer systems.

"It appears that direct reporting to the chief executive officer is likely to be a more prominent feature of MIS organizational structures in the future," the study maintained.

### Relationship to Users

The MIS division's second most important relationship is that with user departments within the organization, the study asserted. A faulty connection in that area may also adversely affect the quality of MIS.

"We know from over two decades in the development and operation of computer systems that a successful MIS organization nearly always involves users early and continuously in projects which affect them," the study commented.

A senior vice-president charged with MIS responsibilities at a major bank expressed his feelings on the subject: "We always insist on a high-level user with full-time involvement on every significant project."

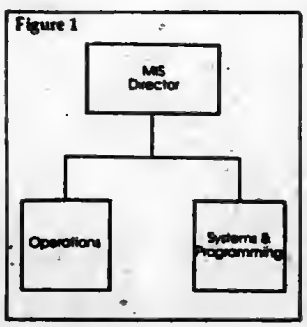
User involvement is a birth-to-grave proposition that begins with communication during the period of project identification and definition. Users must combine with top management to develop an overall priority plan, the study suggested.

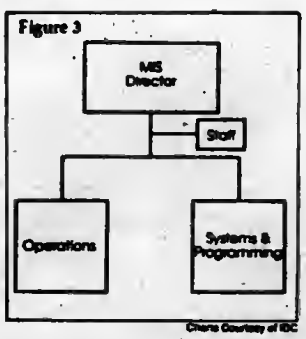
Later on, there must be active user involvement in the functional design process and validation. Next is testing and verification of the system prior to implementation. Finally, the user must have the last word on accepting the system.

In order to ensure good top management-user relations are maintained, the study recommended that "prudent" MIS directors keep a watchful eye on such relationships and suggested some strategies for doing so.

One is the formation of high-level priority committees to involve senior users and top management in deciding on allocation of MIS resources and "implementation of a proactive planning process for MIS which involves top management and users.

"These external factors," the study continues, "while not sufficient conditions for the success of an MIS organization, are much more necessary than commonly recognized and should not be neglected by the prudent MIS manager."



Charts Courtesy of IDC

# Matrix Strategy Key to Success, MIS Study Finds

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Matrix management can be a successful strategy for getting the most out of people in MIS, according to a recent study by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group.

One example of matrix management that failed and then succeeded with modifications was uncovered by ISPS in the course of its study on MIS organizations (see story on Page 4).

The organization is the systems and programming department of a major leasing company. The failed matrix program featured a strict horizontal division between business systems design (BSD) (corresponding to analysis and design) and computer systems design (CSD) (corresponding to programming).

Although project managers were designated by application areas in the original organization, they were not part of either BSD or CSD. Instead, they reported directly to the MIS manager and did not have any supervisory roles.

The project managers tapped "design and analysis personnel [under the supervision of the manager of business systems design] and programming personnel [under the supervision of the manager of business systems design] for their projects on an essentially subcontract basis," the study explained.

The organization failed because the concept of a pool of analysts and programmers created serious morale problems in both areas. Other problems included difficulty in separating programming and design tasks.

### Success in Failure

Even in failure, the organization was successful in so far as it exposed "long-standing weaknesses" that had been allowed to fester within the original, less demanding structure. Deficiencies in planning, business knowledge and management were unveiled.

Although retained, the matrix structure was dramatically altered. Project leaders were placed under the authority of the director of systems and programming to provide "a single point of accountability for the systems development activity and reduce confusion about final authority," the study said.

Project managers were given more authority in the development process, but continued to be divided along application lines and to act as the main interface with user departments.

The controversial pool approach to BSD was dropped and team leaders were assigned to all projects. Team leaders are primarily drawn from BSD, but not to the exclusion of CSD, the IDC study noted.

Team leaders now report to relevant project managers, who have two or three development projects and the same number of maintenance projects reporting to them. They act as daily supervisors of project personnel.

BSD and CSD managers have shed their daily supervision of personnel and now oversee hiring, recruiting, training, standards, personnel management, career development and methodology.

"Perhaps the greatest burden of this approach," the study noted, "falls upon the team leader, who, as one respondent put it, 'sees two bosses more than anybody else.' The team leader is responsible to the project manager on the task side and the BSD/CSD manager on the people side."

"The payoff is getting the people to work harder and faster and smarter," he said. "If you can do that, you won't have to worry about getting the productivity tools. They'll demand them from you."

Figure 2

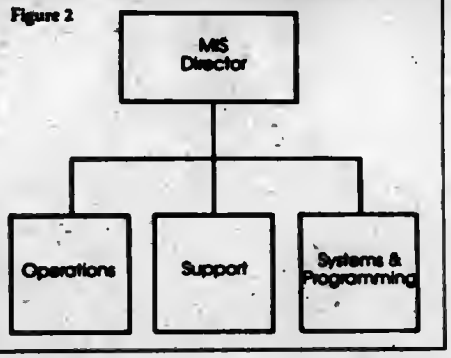
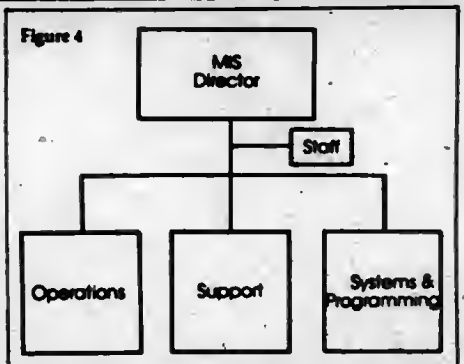



Figure 4

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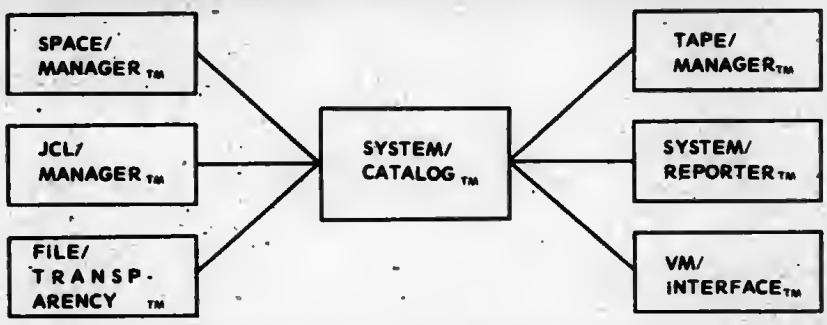


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# Gene Amdahl Plans to Challenge IBM's 'H'

By Marcia Blumenthal
CW Staff

SANTA CLARA, Calif. — You can't hold a good man down. Gene M. Amdahl, who retired as Amdahl Corp.'s chairman and chief executive officer last September, is forming a new company to develop a system that will compete head-on with IBM's intended H series.

Breaking his remaining ties recently with the company he founded in 1970, Amdahl said in a telephone interview last week the H series market "is the only big market in the world. To address another is economically not feasible."

While reluctant to discuss his concept for the new system, he said it would have a different machine organization from current technology and would utilize very large-scale integrated circuits. Expecting IBM's H series to be announced between October and next April, Amdahl said his company hopes to introduce its product by 1984.

Amdahl, who is credited with developing the architecture for the IBM 360, said his former company was committed to a particular road for its next product, which will also compete with the H series.

"I had done everything that could be done to get [Amdahl's] new product ready for market. At the time [I retired] I wasn't very productive at the company," he explained.

Amdahl said his idea for a new company and product were "sort of in the back of my mind."

Starting a new computer company now to take on IBM is a "world of total optimism" compared with when he first started his plug-compatible manufacturer (PCM) business, he observed.

While some observers noted Amdahl may not have the same success with his new business because the market is now software- vs. hardware-driven, Amdahl said IBM's 4300 really didn't have much new software. Rather, the giant repackaged existing products and lowered its prices, he claimed, adding that because hardware prices dropped dramatically with the 4300, IBM's percentage of software revenue now appears larger relative to hardware revenue.

As yet the new venture does not have a name, but Amdahl expects a name will be chosen and the firm will be incorporated by the end of the month.

Joining Amdahl in the venture as president is Clifford J. Madden, who is a former senior vice-president and chief financial officer at Amdahl. The two men are presently in the process of discussing funding with potential investors.

Amdahl said the company's capital requirements will be about $50 million to $70 million and he hopes to have the funding tied down by the end of the year. When asked if he would seek funding from Japanese investors, Amdahl responded "not on the same basis" as with Amdahl Corp.

For the time being the new company will operate as a technology company, with 50 people expected on board within a year, Amdahl said.

How does it feel to be an entrepreneur again? "Great."

# Structured Methods Hike Productivity

*(Continued from Page 1)*

computer department, shows different levels of management with connecting lines representing the lines of control. Control information flows up and down the connecting lines, a concept Faulkner applied to programming.

Another management principle Faulkner espouses is that of delegating responsibility. "Managers get things done through others; they don't do the actual work themselves. This keeps the management function simple and more responsive to changing needs."

Illustrating how these same management concepts are applied to the organization of a typical program, Figure 2 also uses connecting lines to represent lines of control. Eliminating GOTO statements assures that control lines are not broken or crossed, he said.

Each management routine in the diagram has supervisory responsibility only, delegating work to other routines lower in the hierarchy. The control routines, then, remain simple and easy to change; the dotted lines show how easy it is to delete and add routines.

Besides allowing programmers to easily add and remove modules without affecting the rest of the program, the hierarchical GOTO-less programming technique offers other advantages over methods that allow GOTO statements.

One benefit is a 50% to 70% boost in programmer productivity, which Faulkner measures not by lines of code but by how long it takes to produce a finished program.

Using one programmer, for example, his firm put up a Cobol general ledger system in three months elapsed time, or two man-months. When programming with GOTOs, the same application could take six months elapsed time or nine man-months, to complete with two programmers on the project, he estimated.

### Programming Standards

As for other advantages, program maintenance costs have dropped 50% to 75% and debugging time has been slashed considerably, helped also by the fact that Faulkner requires his staff to number paragraphs sequentially.

Sequential numbering and a ban on GOTOs are two of only a few programming standards Faulkner imposes on his employees. Claiming he doesn't believe in enforcing a rigid set of standards, Faulkner said his only other requirements are that staffers use meaningful data names, paragraph names and the COPY statement instead of redefining a file for every program.

The firm has used its structured programming methods successfully with Cobol and Basic and prides itself on being "one of the first companies" to apply hierarchical GOTO-less programming to RPG-II, a high-level language that does not easily lend itself to this methodology.

One reason why RPG-II cramps the "structured" style is that it restricts data names to a maximum of six characters, making it difficult to come up with meaningful abbreviations. In addition, RPG-II does not have an equivalent to Cobol's PERFORM UNTIL statement, forcing the use of GOTOs to control loops. But by containing loops within routines, Faulkner claimed to still maintain the program modularity a hierarchical design provides.

### Programmers' Response

Needless to say, increased productivity, low program maintenance costs and faster debugging time have made Faulkner a strong advocate of structured methodology as he uses it. But do his programmers share his enthusiasm?

Well, "nine times out of 10" Faulkner meets with a certain amount of resentment from new hires who are forced to switch from conventional programming techniques to the hierarchical GOTO-less method. "But once they've written a few programs this way and realized the benefits, I can't get them to change back," he commented.

Also, "the hierarchical GOTO-less method has a tendency to make you work at your desk a little longer to thoroughly understand your problem and to design, code and review the program," Faulkner continued.

He contrasted this to the conventional technique where "if a programmer realized he forgot something halfway through his coding, he could always add a GOTO."

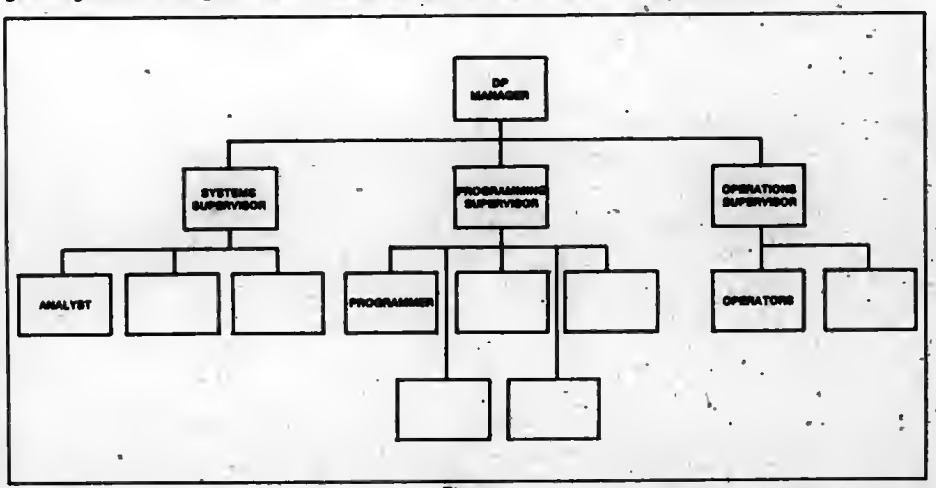


Figure 1

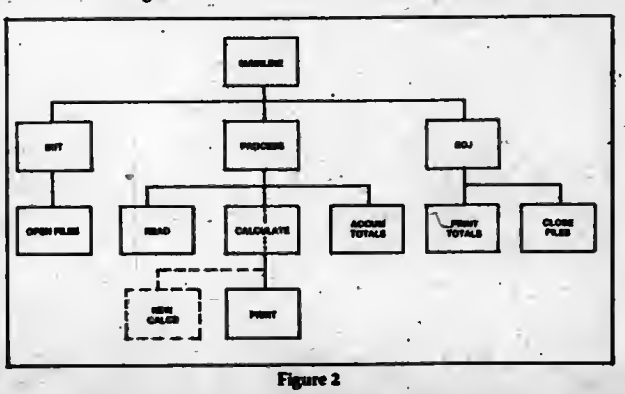


Figure 2

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# Some Defectors From IBM Fold Cite Retaliation

(Continued from Page 1)

Another aggrieved IBM user at a large, midwestern university also got the backlash treatment after moving to an Amdahl 470V/5. "I think they were poor losers," he reported. "After we sent out the bid specs, they responded by making presentations and then high-level executives put pressure on us to start the bidding over."

Although those executives went to his superior and "talked," he was not informed of what transpired.

After considering the possibility of further retaliation, he tempered his comments by saying, "We'd like to continue to do business with IBM and any other vendors."

Citing the same sentiments, the data director of another western state agency admitted he experienced a "horror story" of retribution, but preferred to bury the hatchet with the hopes of improved future relations.

Don Higgins, director of computer services for the Florida Power Corp., also ran into transition difficulties. "Oh yeah, you wouldn't expect them to act favorably," he said of IBM's behavior.

The change to an Itel Corp. AS/6 led to a "pretty heated discussion" between Higgins, his boss, the IBM sales representative and the IBM branch manager, who suggested something was wrong with the evaluation process that bypassed IBM's proffered 370/168 system. "IBM said we didn't do our homework," Higgins said.

Reliability and service, not economy, were the primary reasons Florida Power abandoned IBM, according to Higgins, who, like several other respondents, still retains several IBM peripherals.

### Disaffection Sparked

IBM's inability to deliver 4331 systems within a year's time contributed to disaffection with several respondents, including Dick Padesky, director of information systems for the Prestolite Corp.

"They brought the whole shebang out including local, district and regional people when we decided to change," he commented. IBM "legal people" also came in and "gave us our rights," he added.

Despite the pressure, Prestolite went ahead and bought a Control Data Corp. Omega 480-II, a system Padesky claimed to be far more convenient than its IBM 370/148 predecessor.

IBM registered its displeasure by reducing service levels. "They don't give us the support they used to," he said. After considering his words, he, too, tempered them. "IBM has treated us fairly regarding their own policies," he concluded.

"Limited" was the word Tim Steinhelber, Manager of Data Processing Operations for the Tennant Co., used to describe the IBM retaliation he faced when his firm acquired a CDC Omega 480-II.

Referring to derogatory remarks made by an IBM salesman as "more an irritation than anything else," he said the Omega, which was purchased as the result of a wide-open bidding process, was Tennant's "best financial move." The loser? An IBM 3031.

"The salesman said we deliberately went away from IBM," he said, adding the result was indifference from the vendor on maintenance for the IBM equipment the company is still operating.

Conversely, crossover plug-compatible users who did not incur IBM wrath evinced nothing but satisfaction.

"We've had absolutely no negative feedback. IBM has reacted as any other businessperson would," Robert M. Hackett, director of application services for the San Antonio, Texas, Water Board, said of its switch to an Amdahl 470V/7.

H.T. Herold Jr., director of the department of computer services for the state of Arkansas, concurred. "We haven't experienced anything in the way of retaliation," he said. "And there hasn't been any change in our level of service either."

Expressing the strongest support for IBM's comportment was the state of Illinois' data center manager, Frank Breakville. "I'm overjoyed with the relationship we have with the two vendors," he said of IBM and Amdahl.

# New York Found Not Using Fisa Reports

(Continued from Page 1)

Three of the five agencies surveyed were distributing the report packages to the appropriate personnel as much as a month late. In some cases, the reports never were distributed, the respondents claimed.

Finally, some of the users informed the auditing group that they were receiving too many IFMS reports which served to "distract them from their normal work load," according to the audit report.

### Cost of Reports

About $7.5 million was spent in fiscal 1979 on the DP, personnel service and paper costs to produce the reports. This is more than one-third of the $21 million Fisa expended that same year to operate IFMS, the comptroller's office said.

IFMS was originally designed to provide city agency managers with the means for financial accountability, control, planning and analysis, the report noted. The system's reports, which are unused by the majority of the survey sample, were supposed to give the managers up-to-date financial data. This would, in turn, allow them to quickly detect and correct trends in overspending and undercollection of revenues within the jurisdiction of their respective agencies, the survey said.

Consultants called in to work on the system, which became operational on July 1, 1977, have accounted for $8.2 million in fiscal 1979, according to the audit report. However, a comptroller office representative was unclear as to whether this figure was in addition to the previously cited DP cost of $7.5 million for the year.

### IBM Shop

The IFMS system runs on a configuration that includes an 8M-byte IBM 3033 processor, more than 100 IBM 3330 and 3350 disk drives and approximately 32 IBM Model 3432 tape drives, based on an interview with Fisa director David Woodbridge early this year [CW, Jan. 28].

At that time, Woodbridge stated that IFMS "speeds paperwork and related functions, improves information flow and helps free managers for more creative analyses and decision making." The director was not available at this point to give his reaction to the audit survey findings.

Canvassing users for their updated requirements, conducting studies to better identify user needs and limiting report distribution to those users with identified needs were among the recommendations in the survey.

### Public Pressure

However, the comptroller's office has no legal enforcement powers, a spokeswoman said, adding, "Hopefully, public pressure will bring about a change" in IFMS report distribution.

Fisa is reportedly in the process of conducting its own survey to determine which IFMS reports are needed and by whom. The agency intends to use the results of this survey to revise the monthly report package distribution to fit more closely each agency's needs, the comptroller representative noted.

"However, although this [Fisa survey] seems to be the same thing we are recommending, it's too early to tell if the survey will be broad enough," she said.

The audit report is NYC-66-79, dated Aug. 4.

## Corrections

In an article detailing *Timesharing Decisions*, a report released by Real Decisions Corp. (RDC) [CW, Aug. 18], the figures relating to CPU time were mistakenly rated on a per hour basis. In fact, the figures are based on the average amount of elapsed time it took RDC to run a series of benchmarks with a particular time-sharing service.

In a recent story spotlighting computer time brokers [CW, Aug. 18], Computer Reserves, Inc. was erroneously given an alias and identified as Computer Resources, Inc. The East Orange, N.J., firm has no corporate alter-ego or hidden nom de plume.

Trilog, Inc. has no affiliation to the Houston Instrument Division of Bausch and Lomb, Inc. Misplaced parentheses [CW, Aug. 18] might have caused the reader to assume otherwise.

*Continuing FAA-Controller Conflict*

# Controllers Report Midair Near-Collision

By Jake Kirchner
And Marguerite Zientara
CW Staff

BOSTON — One morning early this month, air traffic controllers at Boston's Logan airport watched in horror as their radar screens showed two airliners converge and pass within 200 feet of each other.

While the actual positions of the two planes is in dispute — the Federal Aviation Administration (FAA) claimed there was never any danger of a midair collision — the incident and what followed points up the increasing lack of confidence air traffic controllers have in their radar and computer systems and the growing conflict between the FAA and controller representatives.

According to the FAA, the two planes, an Eastern Airlines Lockheed L-1011 jumbor jet and a Delta Airlines Boeing 727, were never closer to each other than two miles. Logan tower chief Gary Tucker explained the discrepancy between the radar screen representation and the actual positions of the aircraft by noting the blips on the screen produced by the airplanes' transponders can represent as much as three miles of air space.

### Eye-Witness Account

Controller Michael Fermon, who was present in the tower during the incident, insisted the radar-produced primary image and the superimposed beacon image from the transponders both clearly showed the aircraft passing much closer than two miles.

"I was there and saw it with my own eyes," Fermon said, "and a whole room full of other controllers saw the same thing. What we saw was the beacon and primary targets merge into one target and at the point of the merger [the planes] were within 200 feet [according to] the altitude reporting information that we took off the radarscope.

"I was scared out of my wits," recalled Fermon, who added that the controller responsible for the Delta airliner was "really shook up" and had to be relieved from duty following the incident.

Fermon said the most unsettling aspect of the incident was that the computerized conflict alert system failed to warn the controller before the planes could be directed to change flight paths.

The alert system, which analyzes incoming data and projects the paths of the airplanes, also measures the information against established parameters, and signals controllers if a dangerous proximity is predicted. This system, Fermon said, is almost completely unreliable.

"Ninety-nine out of 100 times that the conflict alert system goes off it's a false alarm," he said. "The time when we needed it to go off, it didn't."

Tucker, however, said the system was checked after the incident and "it functioned perfectly."

Whether there was nearly a tragic midair collision that Aug. 6 morning, 25 miles southeast of Boston, might not be determined until the FAA completes its investigation.

But the controllers' lack of confidence in the conflict alert system and the apparent discrepancies between radar images and backup system data illustrates flaws in the air traffic computer-radar system that have controllers up in arms. This has motivated a worried Congress to consider broad restructuring of the FAA.

The incident is also indicative of the conflict between the Professional Air Traffic Controllers Organization (Patco), of which Fermon is Boston chapter president, and the FAA, which insists Patco complaints about system unreliability are extravagant.

Whether two miles or 200 feet apart, what happened that morning shows the harried, sometimes frightening work environment of the air traffic controllers.

At 10 a.m., Fermon said, his attention was attracted by "a lot of commotion in the [control] room" when two or three other controllers "began hollering" as they tried to separate the two aircraft. Everyone in the room "held his breath" as the two radar images converged and then separated again, he recalled.

Control of the Eastern airliner had already been handed off to the Nashua, N.H., control center when it began climbing toward the Delta jet, he said.

The Delta 727 was instructed by the Boston controller to climb 1,000 feet, according to Fermon, but actually climbed 2,500 feet, apparently to avoid the other plane.

"Human error? Yes, there was human error," Fermon replied. "But it's more complicated than pointing the finger at the controller." If the two planes were really no closer than two miles "then there is definitely a problem with the radar," he said. And if the conflict alert system was working properly, "then it is a damn poor [computer] program and should be changed."

The whole thing is "very frustrating," Fermon said, adding the way it was handled shows "the great deal of antagonism" between the FAA and Patco "that in itself is a dangerous situation." "I don't see it changing any time soon," he said.

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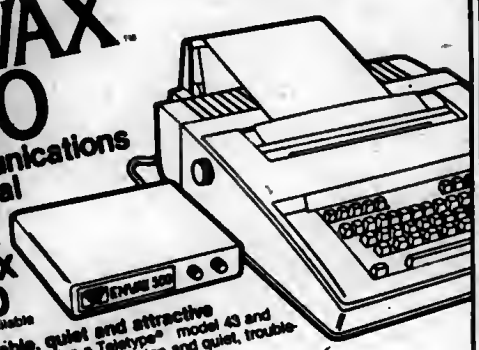

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# USPS Gets Green Light To Launch Ecom Service

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS) finally has received a green light to launch its much-disputed nationwide electronic mail service, Electronic Computer-Originated Mail (Ecom). But when the offering will go on the air was unclear as of last week.

The governors of the Postal Service announced that the rate schedule for Ecom will not become effective until Jan. 4, 1982. They also ordered the new rates to be "placed in effect" on Aug. 15, 1980 and said Ecom service "will commence at such time as the necessary facilities are available."

According to a spokesman for the U.S. Postal Rate Commission — an advisory body which played a major role in developing the new system — this means that if facilities are available before the beginning of 1982, the effective date of the rates will be advanced accordingly.

### Initial Charges

Initially, charges for Ecom service will be 30 cents for the first page of text and 10 cents for the second page. Beginning in October 1981, these rates are scheduled, according to the governors' announcements, to drop to 26 cents and five cents, respectively. But in all cases, the charges cover only conversion of Ecom messages to hard copy at the receiving end of the transmission path and delivery by mail carrier to the addressee. The transmission charge, which was not specified, will cost extra.

The governors' announcement also Mentioned two other qualifications. A $50/year permit fee will be imposed on each mailer, and users will be required to send at least 200 messages in each Ecom transmission.

Ecom will interconnect the 25 largest U.S. cities and deliver a message, in most cases, within two days after it is input. The service will handle messages directed to single as well as multiple addresses and will include word processing facilities able to insert different words, phrases and sentences in messages addressed to multiple recipients.

Ecom messages will be transmitted on-line from the mailer's premises to a serving post office (SPO) in each of the interconnected cities. At that point, the bits will be translated into hard copy and the resulting letter, after being placed in an envelope, will then be delivered by a mail carrier the next time he makes his rounds.

### Transmission Question

The question of who will transmit Ecom messages from the mailer to the SPO has been the major bone of contention between commercial vendors of electronic mail and message services (EMS) and USPS ever since the Ecom idea was proposed in 1978.

Under the scheme authorized by the governors this month, commercial vendors, at least initially, will provide the transmission. But USPS is allowed to lease its own circuits and provide a competing end-to-end service, provided "there is a demonstrated need" and the postal offering is made available "under terms and conditions which preserve free and open competition," the governors said.

Ecom mailers will also have to "arrange for a communications carrier to transmit the messages to serving post offices," they added.

One of many question left unanswered by their announcement is whether these carriers will be allowed to aggregate messages from separate users to meet the requirement that each transmission must contain at least 200 messages.

Another question is whether private data communications will be allowed to interface with Ecom SPOs. Also, during earlier discussion of the new service, an alternate input scheme was proposed. In this case, magnetic tapes, containing multiple message texts and/or address lists, would be physically transported to an SPO in the mailer's city and fed into the network at that point instead of being transmitted on-line from the mailer's premises.

The Postal Rate Commission must consider each proposal before it can be implemented. Both were strongly endorsed by the governors in their Ecom announcement.

EMS vendors don't want USPS to offer Ecom end-to-end, even on a limited basis. They fear this would enable the postal service to underprice commercial competitors. Whether true or not, this view has strong support on Capitol Hill, and so further Congressional hearings, possibly delaying introduction of the service, are in the offing.

Meanwhile, the governors of the postal service are enmeshed in a fight with the Postal Rate Commission. Ostensibly, the issue is whether Ecom should be launched as an "experimental" service terminating in 1984 — as recommended by the commission — or as a permanent service, as desired by the governors.

The governors insist the commission, by recommending the 1984 termination date, has "far exceeded its authority." They have filed a petition for review in the U.S. Court of Appeals.

# APL Methods Topic of Meet

TORONTO — A three-day conference focusing on APL programming techniques and technology will be held here Oct. 6-8 sponsored by I.P. Sharp Associates Ltd.

Geared as a user's meeting, the conference will spotlight the different applications of APL and discuss the viability of PAL compared with other more traditional programming languages. Sessions will involve the use of APL in the aviations industry, personnel and record handling systems, decision support systems and private data bases.

Registration fees for the meeting are $155 for the entire three-day program. Additional information on the event can be obtained from the sponsor at 145 king St., W., Toronto, Ont. M5H 1J8 Canada.

# Formula Claims to Predict Value of IBM Gear

By Marcy Rosenberg
CW Staff

SUNNYVALE, Calif. — While some users rely on equipment appraisals and other commercially available services for aid in predicting the residual value of their IBM computer hardware, in fact they may be able to make equally useful estimates in-house.

One such approach is suggested by Jack van Kinsbergen, president of Bool & Babbage, Inc., here.

Kinsbergen proposed a manual procedure — applying only to large-scale IBM mainframes — in which he correlated past secondary market trends gleaned from Computer Merchants' computer price guide with new product introduction history taken from Datapro Research Corp. data.

Van Kinsbergen's premise is the following:

- IBM CPU schedules are driven by requirements to maintain factory capacity.
- Secondary market values are directly related to IBM new CPU product introductions.
- A cause and effect relationship can be established based on these points.

### Four CPU Stages

His approach assumes that secondary market values have followed a predictable pattern at each of four stages of CPU useful life. Stage I is when a CPU is in full production and readily available, with no successor machine yet announced — much like 3033 today.

At this stage, that CPU's secondary market value would be 85% of its value new, a percentage derived by deducting the 10% in investment tax credits allowable when buying a new computer and 5% as the estimated worth of for free maintenance IBM provides in the first year of ownership.

In Stage II, the next generation successor to that CPU has been introduced and first customer shipments have begun. In effect, this makes the original CPU a generation old and its used value drops to between 60% and 70% of new. The 3033 would enter this stage when IBM begins delivering its successor which for purposes of this analogy is assumed to be the H series.

Taking the analogy a step further, when IBM reaches peak production and volume shipments of the H, the 3033 will enter Stage III and its secondary market value will shrink to between 30% and 40%. Because at this stage the next generation CPU is readily available, the secondary market must adjust its valuation to a new price/performance curve, van Kinsbergen stated.

Elaborating, he explained that if the 3033 costs $X for X amount of power and if its successor offers 2X power for the same $X, a used 3033 has to drop in value to give 1/2X power for $1/2X.

Finally, when a successor to the H reaches full production, it will push the 3033 two generations back into Stage IV and push its used value down to between 0% and 10%.

Van Kinsbergen concluded, then, that "if one can predict when IBM will reach peak production on its next CPU, then one can predict when the current CPU market value will fall below the 40% point."

He charted this four-stage cycle for three IBM CPU families — the 370/155 and 165 (see Figure 1), the 370/158 and 168 (see Figure 2) and the 30 series (see Figure 3). He noted a margin of error of plus or minus 6 months for the dates shown and of plus or minus 10% for the secondary market values.

Based on these charts and his examination of historical secondary market and product introduction data beginning with the 360/50, 65 and 75, van Kinsbergen further concluded that IBM has in the past and will in the future maximize CPU production every four years.

Users, then, that want to keep up with new IBM introductions should put their existing IBM equipment on a depreciation schedule that is consistent with market values, he recommended, adding that "useful life and residual value of CPUs should aim at this peak production point and reduce book value to approximately 30%," a percentage that allows for future IBM price cuts.

Van Kinsbergen admitted his analysis is "simplistic" because it does not take into account costs of conversion if IBM's next computer generation proves incompatible with existing CPU families. Also, it assumes that users will want to stay current and will need to upgrade for more capacity.

However, such an analysis can aid users in making the "purchase versus lease" decision, he maintained. Assuming IBM will continue to maximize CPU prodution every 4 years, users will be able to determine when the next generation will be readily available and what their present equipment will be worth by that time.

With this knowledge, it will then be possible to compare the costs of leasing additional CPU power in the interim as opposed to buying another CPU and reselling it when the new processors become available.

An argument against this analysis and in fact any formula that claims to predict future computer residuals was voiced by American Computer Group, a computer dealer and lessor in Boston.

"If there were a formula for it, then the leasing companies wouldn't have taken the big bath they took," maintained Adolph "Sonny" Monosson, the firm's chairman. "When you have man interfering with the process of changing technology, you can't have a formula."

Agreeing was Paul Blumenthal, vice-president of the American Computer appraisal service. Besides noting the disclaimers van Kinsbergen himself pointed out, Blumenthal contended that formulas assume projected stability in the marketplace.

Continuously changing economic factors also come into play. For example, users were trading in 370/168s for 3032s and 3033s up until three weeks ago "when you couldn't get a buyer or a seller of a 168," Blumenthal said. Why? He explained that while most DP shops were able to budget for their first 3033, they have now started to hold on to their 168s as "cheap insurance" if economic conditions prevent their getting a budget for their second 30 series machine.

Presented with the argument that it might be in the interest of a firm that charges for appraisals to discredit any alternate source of information for predicting residual values, Monosson replied, "If there was a formula, we'd use it ourselves and charge for it."

Figure 1

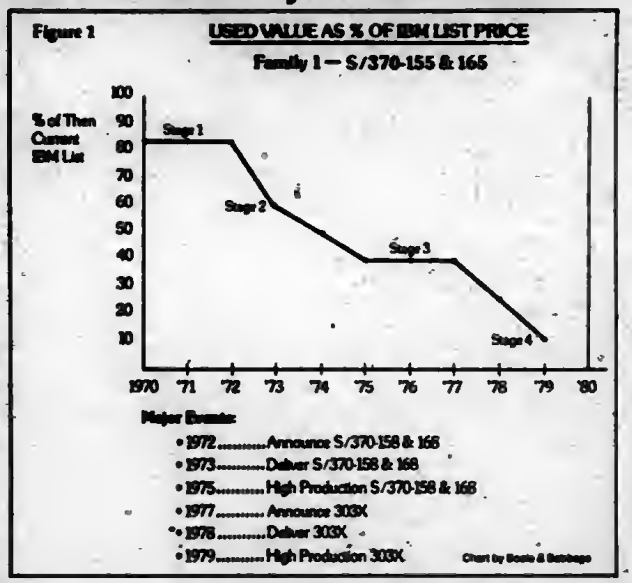



Figure 2

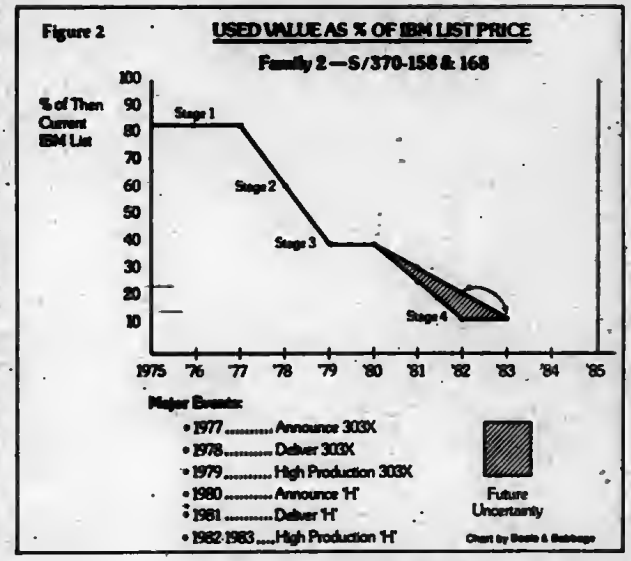
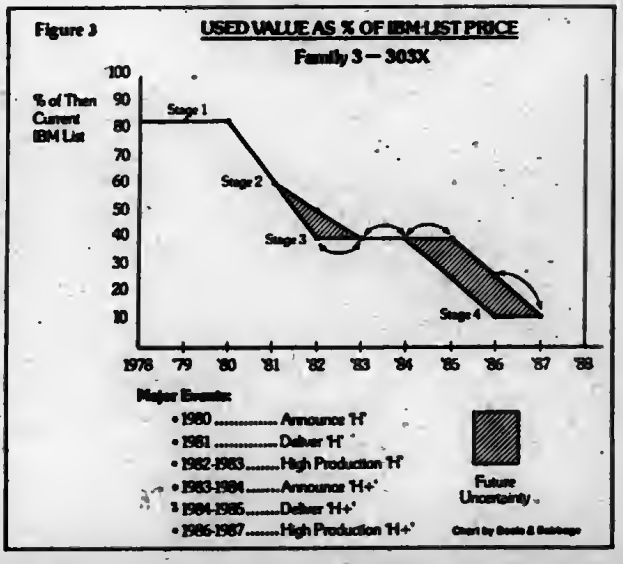



Figure 3



# Deregulation May Launch Major AT&T Venture

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — AT&T is expected to make its debut in the computing field soon, but the company is unlikely to join Amdahl Corp. and Magnuson Corp. as a vendor of plug-compatible mainframes, a communications expert said here during a recent two-day seminar.

The recent deregulation of the computing field's telecommunications sector has opened the way to a major new business opportunity for AT&T, and the company is likely to devote much of its attention to it for some time to come. In fact, so preoccupied will AT&T be in trying to exploit its own data communications market that the firm will effectively bar itself from pursuing any of the computer industry's other important business sectors, according to Dr. Dixon Doll, president of the Ann Arbor, Mich.-based DMW Group, Inc.

Doll, whose company specializes in designing and implementing communications networks, also warned users to expect "gargantuan" rate increases for private, leased data communications lines. AT&T will start pressing for the rate hikes soon and, although they will probably be opposed by a few local regulatory agencies, most of the expected increases will eventually be approved.

### 'Spin-Off' Foreseen

Doll's comments came during an Aug. 12-13 seminar focusing on AT&T's forthcoming business unregulated subsidiary and efforts to restructure the computer communications industry. The seminar — sponsored by the Yankee Group, a Cambridge, Mass.-based management consulting firm — was held to assess the potential impacts of a recent Federal Communications Commission ruling that in effect deregulates the "enhanced services" and telecommunications equipment business.

Now that longstanding restrictions barring AT&T from entering the computing field have at last been lifted, the company is expected soon to "spin off" part of its existing organization to form its first "business unregulated subsidiary." The main purpose of the subsidiary is to serve as a vehicle for introducing "enhanced telecommunications services" and to give Bell its first entree into the computing marketplace, Doll said.

The "enhanced services" business will embrace a huge range of offerings — about a dozen distinct product categories in the data-communications sector alone — and AT&T will clearly have its hands full in trying to address each of the various opportunities.

One portion of the "enhanced services" product spectrum where Bell's emphasis is likely to be particularly heavy is the sector for electronic mail and document storage, (retrieval) and transmission.

Potential user demand for such products, which will be patterned after the forthcoming Satellite Business Systems, Inc. network, is "absolutely gigantic" and could very well dwarf the market for all other "enhanced telecommunications services," Doll said.

Another sector of the data communications business where AT&T is expected to make a major user commitment is the voice-recognition area. Though still considered something of a "wild-card" technology, voice-recognition could nevertheless develop into an important new field of endeavor for AT&T, provided of course the company insists on making its products top quality, he said.

A third major user concern that Bell is almost certain to tackle through its business unregulated subsidiary is the problem of tying together systems that are housed under the same roof. "Most end users don't realize what a serious problem local wiring is until they try to rearrange their in-house communications network and suddenly find themselves faced with the prospect of ripping out and reinstalling miles of electrical cable," the DMW Group president added.

Some of the other important "enhanced services" that AT&T is expected eventually to be supplying, according to Doll, will include:

- Local data networks modeled on Xerox Corp.'s Ethernet.
- Private and public teleconferencing systems.
- Packet-switching networks.
- Interactive, intelligent data terminals.
- Continuously operating corporate data communications networks patterned after the offerings from Tandem Computers, Inc.
- Communications-based word processing systems (both stand-alone and clustered).
- Data-base services and equipment similar to General Telephone & Electronics Corp.'s proposed Viewdata system.

AT&T's success in the "enhanced services" area, however, and its ability to satisfy the needs of its data communications users will depend to a large extent on how many skilled developers of telecommunications software the company can either train or attract.

"The future of the communications field will be very software-intensive, and AT&T will have to make a major investment in teleprocessing programs, even though finding enough skilled programmers to meet its expected demand won't be particularly easy for the company to do," Doll said.

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# FCC Chided for Little Input Into Resale, Sharing Rule

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Allowing resale and sharing of international private-line circuits is a good idea in principle; it will promote lower rates and service innovations. But the Federal Communications Commission (FCC) made a mistake last May when it proposed to eliminate the resale and sharing restrictions presently imposed on U.S. international carriers and their customers. The commission should have consulted beforehand with foreign telecommunications administrations.

This was the chief point made by computer industry companies and trade groups earlier this month when they answered the FCC's invitation to comment on its proposed rules change. IBM, the Association of Data Processing Service Organizations, Inc. (Adapso) and others insisted that since an international circuit is a joint undertaking between a U.S. and an independent foreign carrier, agreement of both parties is essential to make sharing and resale work.

AT&T, the U.S. Postal Service and the President's chief telecommunications adviser — the National Telecommunications and Information Administration (NTIA) — were among those that said the commission should allow resale and sharing of international private line circuits even if other countries presently oppose the idea.

As NTIA put it, "we do not believe so fundamental a national goal as the encouragement of competition and market entry should be frustrated by international recommendations."

NTIA added that some recently-authorized U.S. carriers — such as Consortium Communications, Inc., — are now providing what amounts to an international resale service even though they do not have operating agreements with foreign telecommunications administrations.

"No official sanction has been given to this activity" by the other countries, "but to date there appears to be a form of silent acquiescence," NTIA said.

Strong opposition to the FCC proposal has been voiced by CCITT, an international association of telephone and telegraph carriers [CW, Aug. 18]. However, "we cannot now accurately predict the response of all foreign administrations to resale, since that response may well depend upon . . . conditions the commission may place upon resale activities," NTIA said.

It added that CCI and the other carriers now offering international telex service on a store-and-forward basis through leased-and-resold transmission facilities "have had some public benefits."

Even though the services are limited, NTIA explained, the prices are substantially lower than those charged by the U.S. international record carriers (IRC). "Continued provision of such services at low rates could induce the IRCs themselves to initiate rate and service innovations."

# Terminals Ease Work Load For GCA's MIS Workers

By Rita Shaw
CW Staff

BEDFORD, Mass. — Gather together a management information systems (MIS) staff that isn't title-conscious, move them into a new building and provide them with hardware that makes their jobs less frustrating.

GCA Corp., an international firm specializing in the manufacture of industrial production and scientific equipment, has applied this formula with successful results, according to Gretchen Hughes, an MIS staff member. The firm's corporate headquarters here are located in a building that was opened for staff use in spring 1980, GCA said.

In the often title-ridden world of corporate information systems, GCA is somewhat unique in that the corporate policy is to refer to the 10 to 12 employees with programming, analysis and design responsibilities as "MIS staff members," Hughes said.

"We don't use titles like programmer/analyst or system designer here," she observed. Each staff member is expected to be capable of performing all of the functions — programming, design, analysis and user interaction — necessary to carry a given project through to completion. "Therefore, the lack of a specific title is immaterial."

### Dual-Format CRTs

The selectable-format terminals which GCA has purchased from Lee Data Corp. (LDC) have also contributed to making life a little easier amid the pressures of system development at GCA, according to Hughes. The firm has installed one cluster of LDC Model 2 terminals consisting of a control unit, eight terminals and one printer.

She described the relatively new CRT terminals that allow the technician to switch from an 80-char. print line to a 132-char. format as a very convenient tool.

"It's nice to see your output reports in a single line, particularly when you're developing programs in a remote setup," she observed. The staff is currently running all jobs on an IBM 3033 mainframe located at Oakbrook Data Center in Oakbrook, Ill., with communications set up across telephone lines.

GCA's configuration also includes Digital Equipment Corp. VT-132 terminals with the 132-char. formatting capability, she continued.

This feature appears preferable to the other options available to the programmer working with output report listings, Hughes said. Without a full-line display, the technician is faced with a choice of either switching back and forth between the left and right sides of the displayed data set or trying to make sense out of a report line shown in wraparound format.

### High Resolution

Although character size is noticeably smaller in the 132-char. format, Hughes maintained that the GCA technical staff has not had any difficulty deciphering letters. "Both the LDC and the DEC terminals offer a very high resolution."

This clarity becomes most noticeable with potential look-alike characters. The letter "L" and the number "1" for example, are easy to distinguish on these CRTs, according to Hughes.

A staff member entering a lot of data or working at the terminal through an entire day might prefer the 80-char. format because of the larger letter size, she said. However, if eye fatigue became a problem, you could switch between the formats quite easily, Hughes observed.

She proceeded to prove her point by changing the display of a 132-char. data set to an 80-column format via the entry of two commands and pressing the system attention switch on the LDC terminal.

### Availability Decisive

Availability was paramount in GCA's decision to go with LDC's Series 300 rather than the comparable IBM 3278 Model 5, which also offers 132-char. formatting. The price difference on the hardware was minimal, she said, but the 20- to 40-day delivery time from LDC was a major factor in the plug-compatible vendor's favor.

The MIS corporate staff is currently in the process of developing a sample inventory control file under CICS and eventually plans to offer full on-line inventory capability to between eight and 10 remote locations in the U.S., she said.

Hughes was also enthusiastic over the portability offered by the hookup between the terminals and the control unit. Each terminal is attached to a split coaxial cable and the grommet on the cable is plugged into a wall plate.

Twisted pairs of telephone wire run through the new building's walls to a plug board in GCA's computer room. The other cable grommet is attached to the appropriate plug which is, in turn, attached to the controller.

Since there is a numbered plate for each workstation in the new GCA building, any of the terminals can be operated from any location through the simple expedient of reattaching the cable to the plate and its corresponding plug, she explained.

Hughes rated LDC's service and repair facilities as excellent during the testing stage. In fact, the only real problem that the technicians have encountered appears to be tied to the access method software, she said.

CW Photo by R. Shaw

Diane Monaco, one of the MIS staff members at GCA Corp., working at a Lee Data Corp. terminal.


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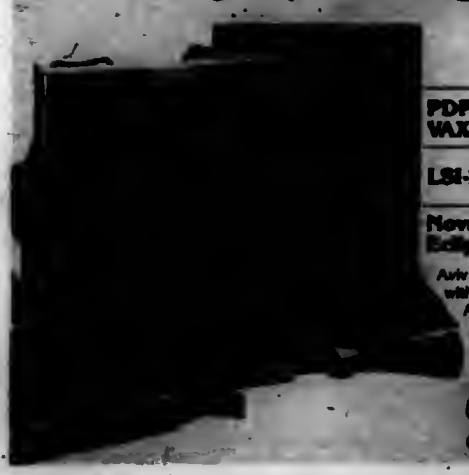

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# Computers Score, Rank Tennis Pros on Circuit

By Bruce Heard
CW Staff

FLUSHING MEADOW, N.Y. — World tennis professionals competing at the 1980 U.S. Open Championship for $654,000 in prize money here this week are being watched by computers as well as people.

While both will track the players' progress and performance, the computers will retain the information long after the other spectators have forgotten it.

It's all part of an effort to rank the pros. The rankings are important because both the Association of Tennis Professionals (ATP), composed of male players, and its counterpart organization, the Women's Tennis Association (WTA), use them as the sole basis for accepting players and seeding for virtually every professional tournament.

The groups use different ranking systems. The ATP has opted for a simple model that can be computed by hand, while the WTA favors the much more complex matrix model designed by the U.S. Tennis Association (USTA).

The ATP system is based on points. The more rounds attained during a tournament, the more points amassed. Points are also awarded in proportion to the total tournament purse and bonus points are handed out to lesser players who defeat anyone ranked 24 or below.

*While both computers and people will track the players' performance, the computers will retain the information long after the other spectators have forgotten it.*

More than 900 players are followed and their status assessed once a week during the 46-week-long season, according to David Arnott, business manager for International Tennis Weekly, the magazine of the ATP.

The player data is processed on the ATP's Texas Instruments, Inc. TI 990. The results and seedings for 92 tournaments are included. "We have everything from $5,000 tournaments to Wimbledon," Arnott noted.

Originated in 1972, the system was first managed by a service bureau, but grew so rapidly the ATP decided to take it in-house in 1976.

### Player Acceptance

One critical aspect of the system is that it be accepted by the players and, according to Arnott, it is. He attributed that acceptance to the effort made by the ATP to apprise the players of how the system works and solicit their input in maintaining it.

"We have a representative in the field each week of the year talking to the players," he said. "Plus, three times a year, each player is mailed a summary of his points and rankings."

In order to ensure player input, a computer ranking committee composed of players was formed. Through the committee the players can express their feelings about the weight of various criteria used to develop the rankings. "The players determine how the system is used," Arnott said.

And the players, especially those ranked between 90 and 130, are especially interested in the weekly standings. For them, tournament eligibility is a week by week proposition and even a slight change in rankings can open — or close — the door to employment.

The USTA system adopted by the WTA is more complex than the number-crunching ATP model, featuring an editing system that walks the user through several pertinent categories of information.

It is similar to the ATP system, however, insofar as it awards lesser players for beating better ones. The difference here is the better player need not have achieved a certain ranking in order for his victor to reap points.

Other criteria include the average rank of players, the overall quality of tournament talent and a player's ranking month by month based on one year's accumulation of data. A minimum number of matches and tournaments must be played for a player to achieve full ranking point values.

John McEnroe

The system runs on an IBM 370/158 located at a time-sharing center in Fairfield, N.J. It is accessed on-line from a USTA terminal in New York City.

### How It Works

This system had its genesis in 1975 and was updated in 1978. When operating it, the user is able to select a function from one of several categories such as, "Enter a tournament?" "Check a player's progress?" or "Request a ranking to be done?"

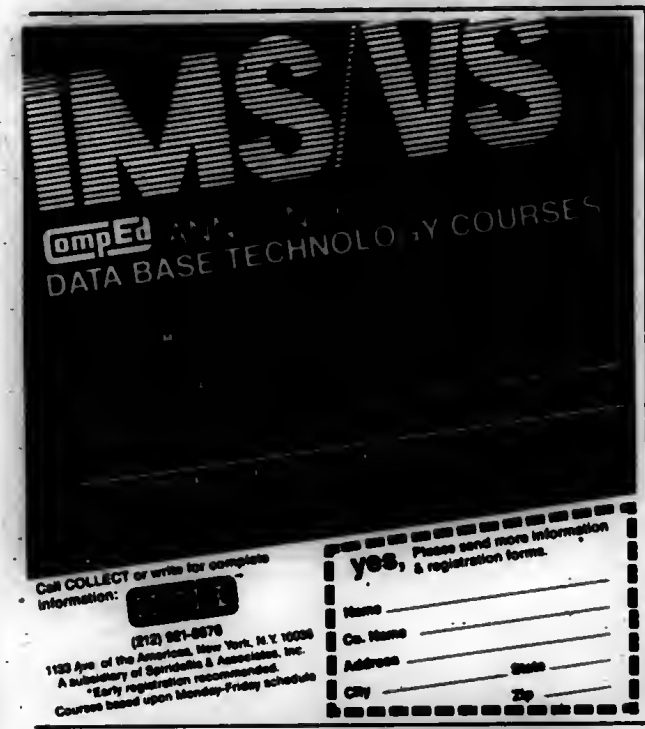
If the first option were selected, the name of the tournament, its location, the date of specific games and the names of all players in the main round competition would come up for viewing.

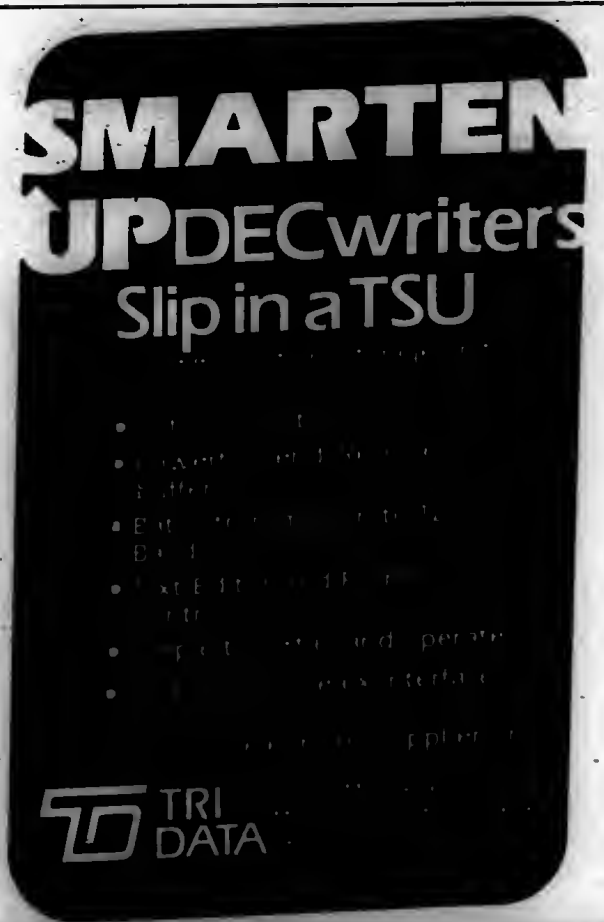
After all players from the main round are entered and verified, the dialogue is repeated for each succeeding round in descending order, with the final round being entered last. The computer then tabulates the information and determines tournament points for each player.

Although touted for its advanced qualities, the system is not yet perfect in the eyes of the WTA, which is thinking about making some changes in it after this week's open, according to a WTA spokeswoman, Stephanie Tolleson.

Like its male counterpart, the WTA has a players' computer ranking committee and all players have input on everything concerning the system, Tolleson said.

And what do the players think of the system? "They think it's good, but sometimes they don't understand it," she said.

CW Photos by A. Dooley

*Clockwise from right: Charlie MacArthur surveys Brown's Mill's hydroelectric dam on the Piscataquis River. MacArthur stands beside the smaller of the mill's two hyroelectric power units. MacArthur in his electric car. A lineup of MacArthur's alternative energy vehicles. Ann Richards and Johanna Provost (left to right), employees at Link Management Services. MacArthur rhapsodizes on the benefits of the bottle of liquid compost he's holding before a tour group.*

# Entrepreneur Gives Life To Mill Town

By Ann Dooley
CW Staff

DOVER-FOXCROFT, Maine — When Charlie MacArthur talks about growing computer-generated tomatoes, people in this tiny New England town listen.

Nestled in a quiet valley of central Maine, MacArthur and his mill are attracting a variety of cottage industries ranging from a walking-stick shop to a computer software company.

This Down East entrepreneur believes in accomplishing the unusual, so MacArthur's next scheme is to persuade some out-of-state business to establish a computer backup site at the old mill. It would be a great opportunity since the mill can lay claim to three different uninterruptible power sources, among them a hydroelectric station, MacArthur asserted.

"The cost of falling water won't change, while other energy costs are likely to go through the ceiling in the near future," he stated.

A native of Maine, this energy-conservationist extraordinaire left the Connecticut rat race to return to his home state, and in 1977 he and his wife Anne bought Brown's Mill, a former wool mill that was built in 1867 and closed down in 1955.

Although the mill is still in the early stages of renovation with some areas restored and others still in a state of rubble and decay, MacArthur is busy filling its 101,000 square feet of usable space with new businesses.

Looking toward the future, MacArthur would like to see 60 small businesses in the mill. And while he realizes the town needs growth, he would rather see small, soft industry move in than any giant corporations. As MacArthur stated, "Why the hell should we destroy the place by inviting GM or U.S. Steel to swallow it up?"

One of the businesses MacArthur wants to attract is computers. Already installed in the mill is Link Management Services, a software company owned by David Singer, who writes business and tax programs for approximately 20 clients in New Hampshire and Maine.

Although MacArthur would like to attract more computer companies, he wants to keep the businesses diversified so that the town will never be in danger of dying, as it nearly did when the mill previously closed down.

Link Management is situated across the mill from a solar energy store and down the aisle from a bakery. In the next room is a barrel-making shop, and MacArthur is looking for someone to take over a basket business which is "ready to go," according to the backwoods businessman.

### Energy Waste

MacArthur undertook his unusual mission — as if anything can be considered unusual for a man who flew over the Arctic Circle in a hot air balloon — partly because of his views against energy waste. Condemning the country's dependence on oil, MacArthur is continually searching for new energy sources.

His search has led him to build a fleet of vehicles powered by anything from bacon or chicken fat to charcoal. The proud owner of a bright yellow electric car, MacArthur can be seen noiselessly gliding throught the avenues of Dover-Foxcroft.

The Maine "yankees," who will take almost anything in stride, have accepted newcomer MacArthur without question. While some might not be sure what he will be up to next, they realize MacArthur is attracting new businesses and families to the economically stagnant area.

MacArthur believes that Brown's Mill is an ideal location for a computer backup facility. Overlooking the lower falls of the Piscataquis River, the Brown's Mill hydroelectric station generates enough power to meet the needs of the entire town of Dover-Foxcroft — population 4,000. In addition, the mill boasts a wood fire burner and a diesel engine which can also heat and run the entire mill.

### Social Stability

Besides the uninterruptible power supply, the area offers almost complete social stability, according to MacArthur. He noted that riots are unlikely, although some of the residents act strangely during hunting and fishing season. Aside from that, the only excitement occurs when "every ten years or so they vote to tear down the two town traffic lights as unneeded."

And unlike other computer centers, the cost of living is low, the pace is slow and as many as 90 houses are available for sale, many for less than what some Silicon Valley computer people might pay for a downpayment.

But MacArthur is not content with just a computer backup facility. He plans to have the computers share their space with vegetables, separated from each other by impermeable walls. Water power can provide basic energy, and the heat given off by the electronic equipment can be recycled through plant-growth rooms during the winter.

MacArthur is sure that some business will jump at the chance to locate a backup site next to the old mill stream.

In the meantime, Charlie is studying the question of how tomatoes can be grown from the excess heat of one computer.

# Honeywell Calls Patent Dispute Misunderstood

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Claiming it is not seeking a software patent, Honeywell Information Systems, Inc. has asked the U.S. Supreme Court to uphold a lower court decision granting the company a patent for a firmware-based module of its Series 60 Level 64 system.

In a brief filed with the court this month, Honeywell said patent office attorneys had "misunderstood and misconstrued" the "switch system base mechanism" in labeling it essentially a computer program and therefore unpatentable under existing statutes and previous Supreme Court decisions.

The device, Honeywell said, "is one of a series of inventions which collectively define an entirely new computer machine." The mechanism in the dispute "comprises register elements, hardware gates, logic circuits and memory elements which are permanently incorporated into the Level 64 computer."

The device, submitted to the patent office in 1975, manipulates system base information in both main memory and internal scratchpad registers. One element of the "mechanism, according to Honeywell's description, is "a microprogrammed hardware control element." It is that element that is the basis for the court case.

### Invention Misunderstood

According to Honeywell, the patent office has mistakenly focused its argument on the one element of the hardware combination in arguing the patent should be denied because the only novel aspect of the device is the firmware, which is essentially an unpatentable algorithm.

The patent office "has not understood the invention at any point in the history of this case," Honeywell said. The device "is a combination of hardware elements and must be viewed in the totality of its elements. No single element of the combination is sought to be patented."

Further, the patent claim does not in any way involve a mathematical algorithm, as suggested by the patent office, Honeywell said. It does not involve any so-called computer implemented algorithm, the company argued.

The patent office "has not identified where in [Honeywell's] application a computer program, a formula, a method of calculation, a mathematical algorithm, a law of nature, an idea or a scientific principle is disclosed or claimed," the company continued. "Hence, there is no basis in the record for [this] conclusion.

"The invention is a new combination of elements which has not always existed and which elements cooperate and function to achieve an improved result," Honeywell said. "Merely because such combination is a permanent part of a computer machine does not convert it into unpatentable subject matter."

### Petition Filed

Using this argument, Honeywell successfully petitioned the Court of Customs and Patent Appeals (CCPA) last summer to grant the firm a patent for the device after the patent office and its board of appeals had rejected the claim.

Earlier this year, the patent office persuaded the Supreme Court to reconsider the CCPA decision [CW, March 24]. The high court will take up the case when it goes back in session this fall.

In stating its position to the court, the patent office described the Honeywell device as a combination of firmware and existing computer architecture. The only new aspect is the firmware, the patent office attorneys argued; therefore the patent should be denied because computer programs are not patentable [CW, July 21].

"Firmware does not convert the conventional computer designed to accept firmware of this type into a new patentable machine," the patent office said.

Honeywell, in its recent filing, said the patent office "erroneously alleges that firmware is a 'computer program' that regulates the internal operations of the computer" and has not shown where in the Honeywell mechanism "any computer program is disclosed or claimed."

The patent office board of appeals, in originally denying the patent, "dissected the claimed combination invention down to only one element which it erroneously labeled a mathematical algorithm," according to Honeywell, thereby characterizing "every digital computer machine as being mathematical and therefore [unpatentable.]

"The [patent] commissioner's unsound position in this case can only be viewed as another step in his repeated attempts to obtain a broad holding from this court that computer-related inventions are not patentable," Honeywell said.

The company suggested the patent office is pursuing the case as a means of dealing with the thousands of computer related patent claims now pending. A decision in the patent office's favor would solve the "administrative difficulties" of handling those claims, Honeywell said.

"The restrictive interpretation . . . espoused by the commissioner would, if followed by this court, effectively . . . prohibit issuance of future patents on computer machines," the company said.

## *Repercussions for Industry?*

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Supreme Court will soon take up two patent cases that could have far-reaching effects on development of patent protection for the computer industry.

Decisions in the two cases — one involving a Honeywell device incorporating microcode, the other a computer-based rubber curing process — could determine the resolution of thousands of computer-related claims now pending in the U.S. patent office, agree all parties involved in the cases.

The patent office has characterized the two cases as representing attempts to patent processes or mechanisms that rely, on mathematical algorithms, and argued the claims should be rejected because computer-implemented algorithms — software — are not patentable under existing law.

### 'Chilling Effect'

Honeywell and several patent law associations oppose the patent office approach and warn of a "chilling effect" on computer patent policies and practices if the patent office arguments are upheld by the court.

"This court need not decide any broad policy issues with respect to the patentability of computer programs" in the Honeywell case, the company said in a brief filed with the court this month.

Honeywell suggested the patent office, if successful, could throw out any computer-related patent application claiming it is based on an algorithm and therefore unpatentable.

### Other Pending Cases

Indeed, the patent office itself noted it has some 3,000 cases pending in which the patentability of computer software or firmware is a potential issue. The office is seeking Supreme Court guidance in considering these applications, according to patent office attorneys.

However, an *amicus curiae* brief filed by the American Patent Law Association argued: "It is only through the use of an ill-conceived, irrational approach to patent claim analysis that [the Honeywell] case can be said to present the issue of whether computer programs are . . . eligible for patent protection."

The government is pursuing the case because it "seeks judicial approval of a proposed (perhaps already established) [patent office] practice, against its stated policy, whereby all claims in computer-related cases would be summarily rejected," the association said.

The patent office arguments "as a whole badly confuse the issues," according to the Los Angeles association, which represents, its brief noted, an area where a large amount of computer development occurs.

"Computers and computer programming are becoming almost as common today as gears and valves," the Los Angeles group noted. "There is no valid reason for denying patentability to inventions that employ computers or programming under the present law than there is for denying patentability to inventions that employ gears and valves."

The patent office, for its part, claims it does not want to deny any legitimate patent claim but says it needs resolution of conflicting court decisions on software patents.

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# Women Offered NSF-Funded Career Upgrade

By Rita Shaer
CW Staff

DAYTON, Ohio — Combine a bachelor's degree in computer science with a certificate in electrical engineering and what have you got?

A person who is "absolutely the highest item on the [employment] market right now because of the electronics explosion," according to Carol Shaw, assistant dean at the University of Dayton School of Engineering here.

And, through a program made possible by a grant from the National Science Foundation (NSF), women with degrees in mathematics, physics or related sciences — including computer science — can qualify for tuition-free studies in electrical engineering at the university, Shaw said.

Dubbed the Fast-Track Late Entry Program, the course outline is designed specifically for adults interested in upgrading their education or redirecting their careers to electrical engineering.

The tuition-free part of the program — consisting of 35 credit hours taught during a 50 week time span — allows the student to earn a certificate in electrical engineering in a program that "advances the participant to an academic level equivalent to that of an electrical engineering graduate," the assistant dean maintained.

When questioned why someone who has majored in computer science would choose to enter this sort of program, Shaw cited the expanding number of jobs available to the person with both programming knowledge and an electrical engineering background. A computer science major is basically a programmer, she stated, but the technician who is familiar with both hardware and software is one of the most highly sought after entities in the job market today.

The program has already been offered twice before, and approximately 70 women have received their certificates, according to a university spokesman. The placement effort tied to the program was described as "highly successful," with some salary increases between $10,000 and $15,000 in engineering positions.

A programmer earning $15,000 annually might expect an increase in salary of as much as $8,000 after successfully completing the program, she claimed.

In addition, the certificate credits can be applied toward a second degree in electrical engineering. However, during the first two years of the program, Shaw pointed out, recruiters showed about the same degree of interest in certificate graduates as they did in those who had earned bachelors' degrees.

Technical courses in the program are conducted by the same staff that instructs undergraduate engineering courses, but a separate staff exists to assist in professional development and placement at the program's conclusion.

More information is available from Shaw at the University of Dayton School of Engineering, Dayton, Ohio 45469.

## Interface West Set for October

LOS ANGELES — The fourth annual Interface West, to be held here Oct. 28-30, will offer a 50-session conference on data communications, distributed data processing and networking, highlighted by six all-day seminars tailored for advanced DP and data communications professionals.

Seminar enrollment is limited and costs $50 per seminar in addition to the regular conference fee of $95. One-day conference admission is $60, and the exhibits-only fee is $10.

More information is available from Interface West, 160 Speen St., Framingham, Mass. 01701.

## Kearns Keynoter Of Federal Meet

WASHINGTON, D.C. — David T. Kearns, president, chief operating officer and director of Xerox Corp., will be the featured speaker here at the Federal Office Automation Conference. In addition to technological advances and potential applications of the automated office, present-day, state-of-the-art uses of equipment will be highlighted at the Nov. 4-6 meet.

More information is available from the Federal Office Automation Conference, P.O. Box E, Wayland, Mass. 01778.

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# Computer Link Helps Put Heat on Arsonists

By Bruce Hoard
CW Staff

NEW YORK — The Arson for Profit Information Center here is saving legwork for arson investigators by providing them with a direct link to the city's computers.

Computers lodged in the city's department of Finance, City Planning and Housing Preservation and Development are being accessed for information ranging from the names of landlords to the disposition of property taxes [CW, Nov. 12, 1979].

In addition, the center has put some of New York's elderly to work gathering valuable, noncomputerized information that can be entered into data banks for future reference.

The Arson for Profit Information Center is part of the Arson Strike Force, formed in 1978 to combat the 12,000 fires of suspicious origin that plague New York annually. Last year, the city reported 7,754 confirmed cases of arson.

## Quick Information

The center is the brainchild of John Engel, first director of the Arson Strike Force.

"One need constantly expressed by law enforcement people was for a quicker way to gather information on arson-for-profit cases," he said.

In order to get at what Engel termed the "tremendous amount of information" contained in the city's computer system, he lobbied for, and received, a Law Enforcement Assistance Administration (LEAA) block grant.

Established on July 21, the center has already provided information from the city's IBM 370/145s to investigators involved in 150 cases, according to Thomas Martin, the center's director.

Investigators can gain information on such items as building code violations and building locations in two to three days to a half-day. Previously, it took weeks to gather the same information.

One prominent user of the new center is Cecil Maloney, supervising fire marshal within the NYC Fire Department. Maloney has accessed the center for information on 75 cases since July 21.

Unscrupulous landlords are frequently the villains in arson cases, he maintained, and information supplied by the center from city computers is helping to "put a brake" on their illegal activities.

The arson scenario starts when a money-hungry landlord purchases a building from an owner who can't afford it any longer, Maloney said. From there, the new owner milks the building for all he can get, while neglecting to maintain it.

"First of all, he gets welfare people in there because he can get welfare to send their money directly to him," Maloney said, "then he doesn't supply oil because he knows the city will in emergencies."

Once the city starts bailing out the landlord, the various transactions are recorded in the Finance Department computer. Added to information in other departmental computers, such as building code violations and property tax arrears, a detailed profile of the landlord is then developed.

If he decides to torch the building, it is easy for him to blame the blaze on his tenants, Maloney said. The fire marshal hopes that word of the center will spread and make unscrupulous landlords think twice before they pull such tricks.

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# Managers on the Move

Thomas J. Mueller

THOMAS J. MUELLER has been appointed director of the computer center at California Polytechnic State University, San Luis Obispo. He will be responsible for providing computer experiences for the university's students and support for its administration. He joined the staff in 1977 and has been acting director since spring of this year.

Mueller formerly served as systems manager and data specialist for ITT-Federal Electric Corp. and range technical contractor at Vandenberg Air Force Base. He was also a consultant and lecturer in computer science and mathematics at Humboldt State University and chaired the Mathematics Department at the University of San Carlos in the Philippines.

Mueller holds degrees from Divine Word College, Ill., DePaul University, Ill., and Oregon State University where he received a Ph.D. in computer science.

• • •

ARTHUR S. ACKERMAN has been appointed audit officer at the Fidelity Bank of Philadelphia, Pa. He joined the bank in 1979 as data processing supervisor in the audit group.

He has an M.B.A. in computer science from Temple University and a B.S. in acounting from the Philadelphia College of Textiles & Science.

• • •

JEFFREY N. CHASE has been appointed corporate vice-president of information management for Chesebrough-Pond's, Inc., Greenwich, Conn. He has been director of corporate planning and management information since 1978.

Chase joined Chesebrough-Pond's as director of corporate systems. His responsibilities now include data processing and long-range planning functions.

Prior to joining the firm in 1974, he was vice-president and general manager of Popular Services, Inc.'s management services division. He was also employed with Celanese Chemical as manager of operations and associated with the Service Bureau Corp.

Chase holds an M.A. degree in mathematics from New York University.

• • •

JAMES E. BURKE has been named director of information services at the Noxell Corp., headquartered in Baltimore. He will be responsible for data processing and systems as well as function as advisor to the international division. Before joining Noxell in 1974, Burke was employed with the city of Baltimore as manager of data processing, department of finance. He holds a B.E.S. degree in engineering science from John Hopkins University.

• • •

JOHN DORLAND has been named head of Commerce Union Bank's correspondent banking division in Nashville, Tenn. He was executive vice-president of data processing for the bank. He will now direct the Commerce Union in relations with approximately 150 banks in the southeast.

Dorland graduated from the U.S. Military Academy in 1963 and holds an M.S. degree from the University of Southern Mississippi and an M.B.A. degree from the University of Tennessee.

• • •

EUGENE MCKEOWN has been appointed director of technical resources for Columbia Pictures Industries, Inc. He will be responsible for software planning and support technology.

He was formerly manager of management information services at West Chemical Products.

He joined Columbia in 1979 as manager of technical resources and is pursuing a B.S. degree in computer sciences at New York University.


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# Managers on the Move

FRITZ EIDSCHUN has been appointed system development manager, data processing division for Panasonic Systems, Inc. He will be responsible for the design, development and implementation of all data processing systems.

Eidschun joined Panasonic as a senior analyst in 1975 and most recently served as systems supervisor in the data processing division.

Prior to this he was employed by Fiat Motors where he developed an order entry and inventory system.

•••

DR. FERNANDO J. CORBATO has been appointed director of Computing and Telecommunication Resources in the Office of the Provost at the Massachusetts Institute of Technology. He will be responsible for oversight of computing services for education, research and administration.

He joined the MIT Computation Center at its inception, later serving as assistant director in charge of programming research, associate director and deputy director.

Corbato received a B.S. degree from the California Institute of Technology in 1950 and the Ph.D. from MIT in 1956, both in physics.

•••

DONALD E. BUSSELL has been promoted vice-president, information services, of Homequity, Inc. in Wilton, Conn. He joined the firm in 1978 as director of information services.

Prior to joining the consulting company, he was assistant vice-president at Maryland National Bank and has held managerial positions at Burroughs Corp. World Headquarters in Detroit and at Northwest Bank Corp. in Minneapolis.

Bussell graduated from St. Cloud State University, Minnesota.

•••

MARTIN NEWBORN has been named director of the Computing Center at Downstate Medical Center, State University of New York at Brooklyn.

Before coming to Downstate in 1967 Newborn was employed at the International Paper Co. and the Mutual Life Insurance Co. of New York.

Newborn holds a B.A. degree from Brooklyn College.

•••

JOHN FIORE has been named vice-president of management information services at Marshall's, Inc., the national retail chain headquartered in Woburn, Mass. Fiore will be responsible for data processing and business systems as well as cash register systems.

Prior to this position he was director of management information services. Fiore has been employed at Marshall's since 1971.

•••

JOSEPH P. LOMBARDO has been appointed vice-president, management information systems for Quality Care, Inc. He will be responsible for information systems support network in the U.S. and Canada.

He joined Quality Care in 1978 as director of data processing. Prior to that he held a similar post with the Haley Corp. of New York.

•••

CEDRIC SNYDER has been appointed manager of geophysical program development and LINDA ELLIOTT has been manager of special processing services at Western Geophysical, Houston.

Snyder will be responsible for the activities of the digital program development group of Western's software services. He received a B.S. degree in earth science from the University of Tulsa and has been managing the PRE/SEIS system for the last four years.

Elliott will coordinate the data base systems and a remote entry system for analysts in Western's processing centers. She received a B.S. degree in mathematics from the University of Oklahoma.

•••

DIANE MAHAN has been named associate director of information systems at Bentley College, Waltham, Mass. She will coordinate and facilitate computer usage by the college's faculty and student body.

Prior to the appointment, Mahan was manager of Academic User Services. A graduate of Clark University, she holds a B.A. in mathematics.

Fritz Eidschun


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ORLANDO, Fla. — The Fourth Annual Data Entry Management Conference will run Nov. 10-13 here. Sponsored by the Data Entry Management Association (Dema), this year's conference theme will be "Improving Productivity and the Quality of Working Life for Data Entry."

Congressman Stanley Lundine (D-N.Y.), a leading proponent of the productivity movement, will keynote the conference.

Ryal Poppa, president of Pertec Computer Corp., will present the industry's point of view.

Additional information may be obtained from Dema, P.O. Box 3231, Stamford, Conn. 06905.


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# Models Provide Crystal Ball For British Gas Supplier

By Robert T. Street
Special to CW

CROYDON, England — In Britain, utilities such as electricity, water and gas are nationalized — that is, they are financed and ultimately controlled by the British government. The image of go-ahead dynamism is not likely to be present in such industries, which by their very nature are not regarded as glamorous.

It is, therefore, surprising to find that one of the most dedicated and enthusiastic users of financial modeling techniques — computer-based, of course — turns out to be Britain's South Eastern gas region (Segas).

The UK has a dozen or so gas regions of which Segas is the one that serves southeast England. Having had their objectives and financial constraints determined by the state, their performance is closely monitored.

### Electronic Crystal Ball

To achieve its objective, Segas needs, especially in these days of ultrainflation, the best crystal ball possible, despite the industry's record profits in 1979. This best possible crystal ball turns out to be a mixture of a financial modeling package, modified where necessary, together with computers with interactive facilities.

The computers used are an IBM 3032 and an Amdahl Corp. 470/V7. The IBM 3032 is used in a teleprocessing network for customer service and accounting, while the Amdahl 470/V7 is used for a similar teleprocessing network mainly limted to regional headquarters at Croydon. The Amdahl application is program and systems development, operational research and short and medium term planning.

The financial package used is Financial and Corporate planning System (FCS) originated and sold by EPS Consultants of London. The package is also marketed in the U.S. by EPS through its U.S. and Canadian offices and by certain computer firms.

FCS is applied in areas such as budgetary control, investment and acquisition appraisal, long-term and strategic planning, resource allocation, manpower planning, consolidation and currency conversion, risk analysis and econometric modeling.

### Simple Basic

Perhaps the best way to describe the language it uses is as a simplified accountant's Basic. It is, however, simpler to use than Basic and considerably less extravagant in its use of statements.

Its main components are Logic and Data, and the system is row-oriented. Logic contains a sequence of numbered statements which indicate the terms to be used and their relationship, for example:

+20 'UNIT PRICE'
+25 'VOLUME'
+30 'REVENUE' = 'UNIT PRICE' * 'VOLUME'

Data allows informaton to be entered into terms defined under Logic, for example:

+20, U, 1.2, 1.2, 1.25, 1.3, 1.33

would allow unit data (hence the U) to be entered into item 20 — that is, unit price.

As might be expected, the DP user takes to this sort of language like a duck takes to the pond, and other staff members without any computer background do not seem to have great difficulty in learning and using the system. However, to cater to staff who may have problems in absorbing the language and, more importantly, to allow new and untrained personnel to use the system very quickly, Segas has further packaged the model so that, where necessary, prompts appear on CRT screens for use in interactive mode.

### Primary Model

The overall Segas model is an Integrated Planning Model (IPM), which is sometimes called the Corporate Planning Model. This is heavily marketing-oriented. In fact, the marketing submodels are the driving force behind the system These forecasts are necessary because marketing and selling by the 12 gas regions and by Segas is a complex business, and also a very large one. Not only does Segas sell natural gas from the North Sea and liquefied gas in much smaller quantities from places like Algeria and Norway, but it also sells complete central heating systems.

The result is that the marketing models alone have to contain forecasts for all these products, together with predictions for the considerable appliance replacement market.

Besides the marketing models which effectively determine overall strategy, the IPM is further influenced by three major factors:

- The philosophy used for the IPM and submodels used interactively.
- The facility with which managers can run their own submodels.
- The speed at which the system, both in part and as a whole, can be processed.

The philosophy used is that the submodel used in the IPM and the submodel for the individual group and management team involved shall be identical, but that every aid possible shall be given to the group to facilitate interactive working.

This interaction is also important since data generated in one submodel can be transferred to other models as required and finally to financial routines where the ultimate assessment of the Segas forecasts is made.

The speed of running of models varies from a few minutes for some satellite models to 15 minutes for the entire IPM. Since staffing costs are ever more significant these days compared with computer running costs, this facility is of major importance.

What is perhaps even more relevant is that Segas has only a small section, staffed by three or four experts, who are directly concerned with modeling and techniques associated with it. This means that the overheads associated with running the system are, especially when considered relative to its usefulness, extremely low.

In fact, this whole concept may be a pointer to the demise of extravagant data bases and heavy-overhead file manipulations which have in many ways characterized the mid- to late seventies.

# Publisher Claims Computer Composed Novel

By Brad Schultz
CW Staff

NEW YORK — Vantage Press, Inc. has recently released a novel it claims was written by a computer system called Melopomene at the Jagiellonian University's Institute of Science and Technology in Krakow, Poland.

The novel, set in the South Pacific, is entitled *Bagabone, Hem 'I Die Now*, which the publishing house declares to be Pidgin English for the expression "Bagabone [a character in the novel] is dying."

But two experts in linguistics and artificial intelligence, who have seen the 136-page novel, maintain that, to the best of their knowledge, no computer can do what Vantage Press claims Melpomene has done.

Moreover, the Jagiellonian University has no Institute of Science and Technology, a spokesman observed in Krakow.

After examining a copy of *Bagabone, Hem 'I Die Now* Vantage Press had sent *Computerworld*, computer science professor James Meehan of the University of California at Irvine observed that the author — whether human or machine — chose to write certain sentences by choosing not to write alternative, semantically equivalent sentences.

That means the author had elaborate rules for decision-making that only an extremely complex set of algorithms could have encompassed — if a computer actually wrote the book as Vantage Press advertised, Meehan said.

Style in prose is difficult to map out logically, the artificial intelligence researcher indicated.

In practice, a human novelist may follow a rule only in certain contexts, which means there is another rule that defines which contexts are appropriate for the first rule.

Algorithms designed to enforce such a melange of rules would have software or firmware implementations requiring enormous amounts of memory in a computer, Robert de Beaugrande, a University of Florida linguistics professor who applies artificial intelligence to theories of reading and writing, pointed out.

Moreover, a computer would need to be taught the language of composition, just as a human would, he said, which in the case of Melpomene's alleged accomplishment would entail storing much of the English language, Pidgin English and Pidgin French, including extensive vocabularies, grammars and rules for idiomatic expressions.

According to Bruce R. Kent of the Vantage Press publicity department, "Melpomene was taught a phonemic alphabet of 44 phoenemes [sic], programmed with the works of D.H. Lawrence, James Joyce, several female writers and few books by the 'angry young men' of the 1960s, and, by using 27 verb patterns and 5,000 systemic semantic units of English, 200 systemic semantic units of Pidgin English and 200 units of French, wrote this book."

It is not clear how Melpomene gathered factual knowledge about life in the South Pacific.

After examining CW's copy of *Bagabone, Hem 'I Die Now*, de Beaugrande said he was sure Poland lacks a computer powerful enough to support such prodigious feats of processing — let alone the expertise to significantly contribute to the state-of-the-art in those areas of computer science and linguistics that bear on automated prose writing.

An Englishman named G.E. Hughes, not the University of Krakow, owns the copyright and is supposed to receive royalties on sale of the novel.

Vantage Press is normally paid by authors to publish their books, Kent said. He declined to state the sum Hughes paid.

To date, CW has been unable to reach Hughes for comment.

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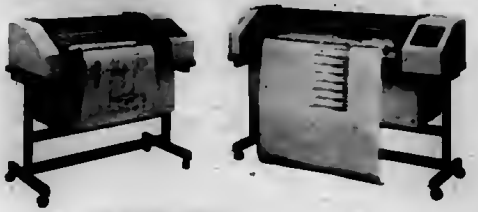

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# Bank Offers Information Services, Triples Assets

ST. PAUL, Minn. — In a state that does not allow branch banking, the Midway National Bank here has enjoyed considerable growth and success in the last 12 years by providing 80 correspondent banks with DP services.

Midway National is the largest independent bank in Minnesota. Its 1979 assets totaled approximately $170 million, more than triple its assets of $50 million in 1968, when the bank initiated DP services for correspondents.

Midway National is now the fourth-largest bank in the city and the 13th largest in the state. But, according to Senior Vice-President Gerald A. Bilski, Midway National is a relatively small bank that has remained very competitive in its market.

"Two other banks in this area each have more than $1 million in assets," he said. "Although they are much larger than Midway National — controlling about 55% of deposits in the state — we are competitive and surpass them in many areas because we have made a concerted effort to use good marketing practices and the most sophisticated DP equipment and techniques available."

The bank's first computer, a Burroughs Corp. B300, was installed in 1968. It was replaced by dual B3500 systems, which were in turn replaced by two B4700s in 1977. The B4700s and a network of approximately 175 teller and CRT terminals used by correspondents and by the bank will be augmented by Burroughs equipment on order that includes a B3900 computer system, 20 MT 300 preprogrammed teller terminals, 75 CRT terminals and three RT 6000 automatic teller machines — two to be installed in Midway National's lobby and one to be installed by a correspondent bank.

Bilski said the response time of current terminals is less than three seconds. "The ability to get information quickly is an important aspect of our business," he said.

The bank provides its own 35,000 customers in the St. Paul area with full banking services. In addition, since there are no branches, the bank has made extensive use of a shared electronic funds transfer system that allows its customers to deposit and withdraw at 136 remote service units.

In serving correspondents, Midway National is really "a bank for bankers, because we supply services for many state-chartered banks that are not members of the Federal Reserve Bank," Bilski said. Midway National provides full DP services for 40 banks in Minnesota within 160 miles of the data center. Forty other banks in the state use Midway National's services only for check collection.

The B4700s process approximately 500,000 checks each day and service 166,000 checking accounts, 164,000 saving accounts, 52,000 installment loans and handle more than 23,000 overdraft checking accounts. The data center uses terminals, four Burroughs reader/sorters and a number of S1500 document processing systems with magnetic ink character recognition capabilities.

The data center receives deposit slips and checks from correspondents each evening by couriers. Items are processed on the reader/sorters. Files are updated, reports are generated and information is returned to correspondents by couriers the following morning.

The bank's B4700s are presently using a number of Burroughs program products. These include the Network Definition Language, the Item Processing System used for processing checks and the Total Information System (TIS) software package, which accesses and retrieves information regarding all customer, account and management information.

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# NTIA Seeks to Curb Federal Home Loan Banks

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Federal Home Loan Bank Board (FHLBB) should not compete with commercial DP service bureaus, the President's chief telecommunications adviser said recently.

The comment was inspired by a proposed board rule that would permit its 12 member banks to provide a wide variety of on-line data processing services to savings and loan associations and other thrift institutions offering NOW (negotiable order of withdrawal) accounts. The rule was proposed after Congress passed legislation earlier this year allowing widespread use of NOW drafts as an alternative to checks.

The Carter administration's position on the proposed rule was spelled out by the National Telecommunications and Information Administration (NTIA). In its recent statement to the Federal Home Loan Bank Board, NTIA argued that "the government should remain out of the marketplace unless essential services cannot be provided by the private sector.

"This has not been the case; in fact, a wide variety of private companies and financial institutions, already provide services to thrift institutions . . . The presence of expanded government enterprise in this area could needlessly chill private sector initiatives."

Another comment was filed by the Association of Data Processing Service Organizations, Inc. (Adapso), which won a court order in 1976 barring federal home loan banks from performing DP services for their member thrift institutions.

The FHLBB insists that the recently passed legislation nullifies this order. However, Adapso contended in its statement to the board that the legislation explicitly limits the kinds of DP services a home loan bank can perform — they must be related to "the settlement and processing of drafts and other instruments as authorized by the act."

According to the association, this limitation bars a home loan bank from doing account processing, packaging and mailing of customer statements and other chores encompassed by the proposed rule.

The Federal Home Loan Bank Board is expected to take final action on the proposed rule at the end of the month.


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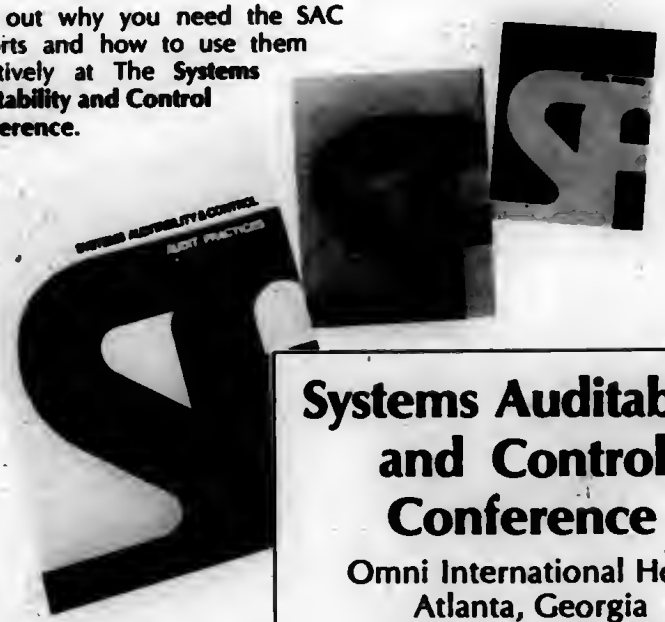

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## Calendar

Sept. 8-10, Minneapolis — National Seminar on Computer Security. Contact: Data Processing Security, Inc., 200 E. Loop 820, Fort Worth, Texas 76112.

Sept. 15-19, New York — Vsam for Assembler/Cobol Programmers. Contact: Software Education Corp., Grace Building, 1114 Avenue of the Americas, New York, N.Y. 10036.

Sept. 23-26, San Diego — Modern Digital Communications. Contact: Evolving Technology Seminars, Suite F, 3725 Talbot St., San Diego, Calif. 92106.

Sept. 29- Oct. 2, Los Angeles — Software Configuration Management, cosponsored by Software Enterprises Corp. and the American Society for Quality Control. Contact: Software Enterprises Corp., 2239 Townsgate Road, Westlake Village, Calif. 91361.

Sept. 29- Oct. 2, Paris — International Symposium on Telecommunications Network Planning, sponsored by the Secretariat for the Post-Office, Telecommunications and Teledistribution and the Societee des Electricalans, des Electriciens et des Radioelectriciens. Contact: Secretariat General du Colloque International, 11, Rue Hamelin, 75783, Paris Cedex 16, France.

Sept. 30, New York — Computer Finance Methods. Contact: Davsell Ltd., 33 Gold St. L-2, New York, N.Y. 10038.

## Correction

The seminar on "DP Disaster Recovery," Sept. 24-26, is sponsored by EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154, not by EDP Recovery, Inc. as listed in *Computerworld's* Aug. 18 issue.

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## *From Risk Analysis to Smoke Detectors*

# GSA Finalizes Federal Security Regulations

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Security regulations for federal agency DP and telecommunications systems and facilities have been finalized by the General Services Administration (GSA).

Two years in development, the regulations announced last week cover everything from risk analysis, temperature and humidity controls and smoke detector placement to the proper use of trash bins in DP rooms.

The new section of the federal property management regulations pull together in one place existing practices and new directives and bring agency security procedures in line with Office of Management and Budget (OMB) policies, according to Charles Schwaner of GSA's Automated Data and Telecommunications Service.

Schwaner, who directed development of the security guidelines, said more than 200 federal agencies commented on the document as it went through various drafts.

### Two-Year Development

The amount of research involved and the number of comments received, as well as the need for close coordination with OMB and interested Congressional committees, explain why it took two years to develop and implement the final regulations, he said. Their development was mandated in a 1978 OMB directive [CW, Aug. 7, 1978].

The new regulations establish a general governmentwide policy that "security must be a daily concern that is given priority attention."

All agencies must develop "an adequate security program" that ensures "under all conditions sensitive data is safeguarded from disclosure and [affords] protection from unauthorized modification and destruction." The program should provide for "operational reliability of the ADP and telecommunications systems and provide asset integrity for prevention of loss from natural hazards, fire, etc.," the regulations stipulate.

The head of each agency is made responsible for establishing his organization's security program and designating a security officer for each DP or telecommunications facility. The security arrangements must be independently audited at least every three years in facilities that process personal, proprietary or other sensitive data.

Other parts of the security regulations mandate are:

- A risk analysis for each facility before approval of design specifications for new computer installations or in the event of a "significant change to the physical facility or to the hardware or software." The analysis is to be renewed at least every three years.
- Reduction of sensitive facilities through consolidation of locations processing sensitive data.
- Contingency plans, reviewed and retested at periodic intervals, to provide alternative capabilities for maintaining priority applications. These plans should include "the appropriate response to fire, flood, civil disorder, natural disaster or bomb threat," and include development of backup arrangements and recovery procedures.

As an example of preparing for natural disasters, the regulations specify that "plastic sheets should be readily available to cover at least the CPU and those peripheral units susceptible to water damage." Fire prevention and fire fighting requirements are spelled out in existing government regulations, to which GSA refers in this document.

The new regulations also cover screening procedures for personnel, warning systems for humidity and temperature controls, locking of doors and vaults and supervision of facility maintenance personnel.

According to Schwaner, GSA will soon issue procurement regulations that compliment the security guidelines, specifying how agencies should acquire security equipment and services and outlining security considrations for procurement of new facilities and equipment.

The security regulations went into effect with their publication in the *Federal Register*, Aug. 11.


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# Canadian Show Set for November

TORONTO — The 1980 Canadian Computer Show will be held here Nov. 11-13 and is expected to attract 200 exhibitors and 15,000 attendees, according to the show's sponsor, the Canadian Information Processing Society (Cips).

Every major computer supplier operating in Canada will be represented, as well as medium and small-size vendors of systems, computer-related equipment, supplies and consulting services, the sponsor claimed.

Exhibitors will be charged $7 per square foot for booth space; standard-size booths of 10 feet by 12 feet cost $840. The registration fee is $3 in advance and $5 at the door, Cips said from 26 Butterick Road, Toronto, Ont. M8W3Z8 Canada.

# Mini, Terminals Tally Scores At Memphis Golf Tourney

MEMPHIS, Tenn. — Golfers were not the only ones taking part in the action on the green here last month at the Danny Thomas Memphis Golf Classic. Tucked off to the side, a Honeywell, Inc. minicomputer was used to keep tabs on the players' scores during the event that was held to benefit St. Jude's Children's Research Hospital.

Although Professional Golfer's Association (PGA) personnel did the official scoring, the Level 6 computer and 10 VIP 7700 terminals tabulated results and provided up-to-the-minute summaries for members of the press and golf fans. This was reportedly the first time a computer-based scoring system was used at the yearly fund-raiser.

By punching in the three-digit code assigned to the player, spectators or press members could learn how a particular golfer was doing in the competition. At the same time, the CRT terminals, which were scattered throughout the host Colonial Country Club, provided a listing of the top 15 golfers at any point in the tournament.

In addition to having access to the terminals, fans could pick up a computer printout each morning detailing the play of the previous day on a hole-by-hole basis. The Level 6 produced 2,000 of these reports each night, a Honeywell spokesman said.

The software for the scoring system was developed last year to prepare pairings for the competition. This year, in addition to the pairing, the system was utilized for the on-line scoring, the spokesman noted.

Honeywell field engineers in Memphis volunteered to lay the more than 3,000 feet of cable needed to hook up the CRT terminals at the country club.

In keeping with the purpose of the tournament, all of Honeywell's hardware, software and maintenance services were donated. In addition, the cable was provided by Federal Express Corp., a Honeywell client in Memphis.

# *Entry Error Becomes Dirge In Medicare Snafu*

By Bruce Hoard
CW Staff

CHICAGO — Mary was living in the dead zone. The computer dead zone, that is.

Mary, who prefers that her last name remain withheld, moved into the murky depths of the computer dead zone after filing a claim with Medicare to help defray the costs of her chemotherapy treatments.

She expected to receive checks. Instead, the Social Security Administration's Medicare Unit sent her computer-generated death notices.

"Social Security Administration records indicate that the Medicare beneficiary named above is deceased," they read.

Somehow, word of the snafu finally reached Electronic Data Systems Federal, (EDSF) the company that processes Social Security and other federal claims for Illinois. Informed of the oversight, personnel there corrected their records and began sending Mary her checks.

As it turned out, the hospital billing her had mistakenly entered her discharge date in the date of death section of the claims form. The erroneous information was then entered in the EDSF computer system, which resolutely insisted Mary was dead until the faulty human input was eliminated.

# Call for Papers

THE 1981 IEEE/PES TRANSMISSION AND DISTRIBUTION CONFERENCE AND EXPOSITION, Minneapolis Auditorium and Convention Hall, Sept. 20-25, 1981.

"The Impact of Change on Tomorrow's Transmission and Distribution Systems" is the conference theme, reflecting the need for evolutionary changes in components and system integration to meet external uncertainties and changes.

The conference scope includes all transmission and distribution functions related to power systems engineering, lines and accessories, substations, switchgear, transformers and surge protective devices, with added emphasis on system protection, relaying, control and communications.

Prospective authors should immediately request an author's kit from: IEEE Headquarters, PES Special Activities, 345 E. 47 St. New York, N.Y. 10017.

Further information is available from D.L. Nickel, Technical Program Chairman, Westinghouse Electric Corp., 700 Braddock Ave. E. Pittsburgh, Pa. 15112.

CONFERENCE ON LASERS AND ELECTRO-OPTICS (CLEO '81), Washington, D.C., June 10-12, 1981.

Papers are sought for the following topics, among others: optical-fiber communications free-space optical communications systems; optical-fiber sensors and applications; laser scanning, printing and display; and novel laser applications and systems.

Two copies of both a 36-word abstract and a 200- to 500-word summary should be sent by Jan. 12 to Cleo, c/o Optical Society of America, 1816 Jefferson Place N.W., Washington, D.C. 20036.

"COMPUTER INTELLIGENCE: THREE DECADES," a special issue of the *IEEE Transactions on Pattern Analysis and Machine Intelligence* to be published in November 1981.

This special issue will mark the 30th anniversary of the publication of A.M. Turing's paper on "Computing Machinery and Intelligence."

Papers on all aspects of machine and artificial intelligence are invited. They are due Jan. 1.

The papers should be sent to Dr. Judith M.S. Prewitt, Division of Computer Research and Technology, National Institute of Health, Bethesda, Md. 20205.


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## *Along With North Star Horizon*

# Cromemco Two Outperforms Costlier Systems

By Hillel Segal

Showing considerable strength in the real-life application problems, Cromemco, Inc.'s System Two performed well in benchmark testing sponsored by the Association of Computer Users (ACU).

Of the six systems tested so far in its price category, the System Two placed first in one application test and second in two others. Along with the North Star Horizon discussed in last week's column, it shared the distinction of outperforming all the systems in Series 2 — which covers computers priced between $15,000 and $25,000 — in the accounts receivable problem.

Like other systems in Series 1, the System Two costs less than $15,000. All tests were run using identical programs written in Basic, where that language was offered.

The Cromemco System Two's best showing was in the new product development problem — an application test which models the relationship between product production costs and profitability over a four-year time period. The System Two's time of 10 seconds leads the current less-than-$15,000 field and bettered the Series 2 average by 7.5 seconds.

The System Two's performance of the other two applications problems placed it second in the six-system field of Series 1 computers tested. It finished the scientific/engineering problem in 14:52.6 and the accounts/receivable problem in 2:48.0. The latter time was also better than that of any system tested in the more expensive Series 2.

### Slower Math Functions

In analyzing the results of other benchmark tests on the Cromemco System Two, it is apparent that while diskette access time was on a level with the rest of the less-than-$15,000 group, the mathematics capabilities were hampered by slower performance of the exponentiation and square root functions.

In the CPU-intensive testing group, the System Two scored much better when those two functions were not needed than in the standard test which includes exponentiation and roots along with addition, multiplication and division.

The benchmark tests were performed on a System Two configuration which included 64K bytes of memory, two minidiskette drives, a CRT/keyboard, and a Centronics, Inc. Model 3703 dot-matrix printer. The double-sided 5-1/4 in. diskettes hold up to 173K bytes each.

A hard-disk system using 11M-byte Winchester-type drives is also available. Designated the Z-2H, this system was benchmark tested at the same time. Its results are included in the full report published by the ACU.

As was the case with the North Star system discussed in last week's column, the Cromemco System Two is based on a Z80 microprocessor and designed around the S-100 bus. Many hardware options usable on S-100 systems are available from other manufacturers.

A feature of the keyboard worth noting is the addition of 20 user-defined function keys. These may be labeled by the user and incorporated into the system operating procedure with suitable software. For the person who frequently performs a standard operation or calls a set of programs, this could speed up human interaction with the computer.

However, these are not quite like the soft keys incorporated on the Hewlett-Packard Co. 250, a system covered during the reports on Series 2 testing. HP's version places the soft keys on the CRT housing rather than the keyboard and assigns temporary functions to each key by placing a suitable label on the CRT display adjacent to the key.

### Some User Dissatisfaction

Although the Cromemco function keys impressed the independent consulting firm which performed the benchmark tests, one customer contacted during the user survey commented: "While the function keys seemed to be a great asset at the beginning, they're really not as useful as first thought."

Another user complained that the desk offered along with the system is "awkward and uncomfortable to work at for any length of time."

The System Two that was tested came with a disk operating system called Cdos and an enhanced version of Basic which included a number of structured programming features. The Basic takes up 32K bytes of the memory area, leaving the user with only 19K bytes. As a result, some of the math computations required in the benchmark programs were done using a short floating-point mode which reduced accuracy from 14 to six digits.

The structured programming statements, such as IF . . . THEN DO . . . ELSE . . . ENDDO, WHILE . . . ENDWHILE and REPEAT . . . UNTIL, supply many programming features now used in Pascal. In addition, the language is semi-compiled in a way that is transparent to the user. After each line is entered, the system checks for errors and establishes tables required by the statement. This initial line-by-line compilation simplifies debugging and speeds up the program run.

A 16K-byte version of Basic is also offered by Cromemco. Besides these, the firm can supply Fortran IV, a rational, structured Fortran called Ratfor, a multiuser Basic and a Z80 Macro Assembler. Recently, Cromemco announced the availability of RPG-II and Lisp as well. But the company calls its 32K-byte Basic "the most complete and efficient language" they offer.

### Multitask System

A new operating system called Cromix is reportedly under development and will be announced soon. It is a multiuser, multitask system with a "C" language compiler as an added option.

A memory upgrade to 128K bytes total, leaving 64K bytes for the user, is a precondition of the Cromix system, but a speed advantage in I/O operations of a factor of two and the ability to keep track of multiple users with hierarchical directories are two significant system features. When used with the hard-disk option, it provides "supermini performance out of a micro," according to a spokesman.

All of the users contacted during the survey portion of the benchmark study were using a hard-disk equipped system in a business environment. Applications varied from accounting and inventory control to word processing, data base management and mailing list generation. Most of the customers were doing their own programming and their software experience ranged from moderate to extensive. Cromemco itself does not supply application packages.

Among the users interviewed for our user survey, the System Two was being used at least eight hours/day in most cases. Reliability was rated very high. Several users were repeat customers with Cromemco, and all of those contacted reported they were satisfied with their purchase.

Next week: The Texas Instruments, Inc. 771.

## SCOREBOX

**System: Cromemco System Two**
**Current Price: $9,275**

**SERIES 1 RESULTS**

| | | TIME |
|---|---|---|
| C-1 | Scientific/-Engineering Problem | 14:52.6 |
| C-3 | Accounts Receivable | 2:48.0 |

**OTHER BENCHMARK RESULTS**

| | C-1 | C-3 |
|---|---|---|
| Pertec PCC 2000 | 28:46.4 | 6:04.3 |
| North Star Horizon | 12:01.9 | 1:57.7 |
| Cromemco System Two | 14:52.6 | 2:48.0 |
| Texas Instruments 771 | To be covered | |
| Vector Graphic System B1 | in future issues | |
| Decistation 78 | | |

**This is the 15th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.**

## About the Author

*Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.*

*One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.*

*In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.*

*A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.*

# ICCC/80 Conference in Atlanta To Stress Societal Themes

ATLANTA — More than 125 original papers will be presented at the Fifth International Conference on Computer Communication (ICCC/80), to be held here on Oct. 27-30, according to its sponsors.

Hosted by the International Council for Computer Communication, the conference acts as a major forum for exploring social, economic, political and technical aspects of computer communication networks around the globe.

The theme of the four-day event will be "Computer Communications: Increasing Benefits for Society."

Detailed advance programs and registration information are available from ICCC/80, P.O. Box 280, Basking Ridge, N.J. 07920.

# Do Managers Condone Retaliation?

**Q** I read with interest the comments regarding vendor retaliation [CW, June 23]. In your comments regarding retaliation by "Big Brother," you stated "these retaliations are prompted by circumstances discussed in the previous column and through the initiative of the individual marketing representatives and, in rare instances, their immediate managers. Vendor retaliation is accomplished without the knowledge and certainly without the support of higher level corporate officials."

I think you should be aware of the fact that in some places, vendor retaliation is conducted personally by the branch manager. This would give the indication that vendor retaliation is condoned in the highest offices of "Big Brother."

**A** It does happen, but remember, the branch manager is the local operative and is a far cry from being classified as a "higher level corporate official." In this highly competitive market of computers, I still contend that no high level corporate official would condone retaliatory actions of any kind.

Although you mentioned the guilty branch office in your letter, I am reluctant to print the name of the city for fear of retaliation.

**Q** We have a competent staff of information service managers, but we are highly inbred with all but one having been promoted up through the ranks. I am an assistant manager of corporate information services of a multinational company.

I'm not alone in my feelings that we are all too close to the problems of running information services. It has been suggested that we invite fresh input from someone outside the company, especially in the area of strategic planning. Also, we would want this individual to not only confirm or question our approaches in several other areas, but offer new insights.

Where would I look to find such a person?

**A** Consultants with the breadth of knowledge that you desire do not confine their work to particular geographic locale and often work on a global basis. Therefore, don't limit your search to the yellow pages.

Good consultants with the general knowledge and wide range of DP experiences required for strategic planning are few and far between and in great demand. Such individuals often author books and articles and are invited speakers at national conferences and professional seminars. Their exposure gives you and your colleagues an opportunity to evaluate the merit of what they have to say and their potential to contribute to your organization. If you are impressed with what a particular person writes or says, the publisher or conference/seminar organizers will usually give you the consultant's business telephone number.

I would like to laud your foresight in recognizing the benefits of having ongoing input from outside the company. Invite several consultants in for at least two days each and give them an overview of Information Services operation, then invite their general input. Select that individual who has the most to offer and place him on a retainer that would include no more than two or three on-site days per month. (Consultants providing general input and advice on strategic planning tend to lose their effectiveness with too much internal exposure.)

**Q** About two months ago, I read an article in *Computerworld*. The article stated that computer programmers and analysts will have to pass a test and receive a license before they are hired into the job market.

I am presently a student in data processing and am interested in working as a programmer.

Please let me know if licensing is now a requirement or will soon be.

**A** Licensing and certification have been hot issues in the computer community during the last decade. As the public and corporate executives recognize the enormous responsibilities that programmers have over money and the way people live, the issue of licensing will become more intense. But for now, there is no requirement for computer programmers to be licensed, nor do I expect such a requirement in the foreseeable future.

---

*Have a question? Send it to Larry Long, Editorial Department, Computerworld 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

*Long is a professor at Lehigh University, a DP consultant and author.*

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By Larry E...


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# EDITORIAL

## Involuntary Union

Management information systems (MIS) personnel may not appreciate being considered clerical workers, but that's how they are regarded by at least one labor union, the Brotherhood of Railway and Airline Clerks (Brac), which recently won approval from the National Mediation Board (NMB) on a scheme to absorb the nonmanagerial MIS staff of Western Airlines, Inc. — whether the staff likes it or not.

In September 1979, Brac asked the NMB, an independent federal agency, for permission to incorporate Western Airlines' programmers, systems analysts and other nonmanagerial MIS professionals, who at the time were unaffiliated with any union [CW, Aug. 18]. The NMB agreed last May to specify 11 MIS job categories as within Brac's purview, but while Brac's petition was reviewed, neither the government agency nor the union bothered to ask the workers in question about their opinions on the matter.

Those workers only learned of the NMB's ruling on Brac's petition in June and, together with the management of Western Airlines, have reacted with expressions of surprise, anger and resentment. Other airlines now face the prospect of a similar government-endorsed union takeover of computing personnel, some of them have warned.

The relationship between Brac and the Western Airlines workers is complicated by the fact that a portion of Brac's membership, disaffected with the union's leadership, recently voted to form a separate organization called the Air Transport Employees Association (Atea).

According to a Western Airlines systems analyst, Brac may have pushed for control over MIS personnel simply to delay the vote that finally established Atea, results of which became public on July 30. Atea is now the official labor representative for Western Airlines, however, so Brac's maneuver has apparently resulted in giving the new union 11 categories of the airline company's MIS staff, but still without that staff's approval.

Why are MIS workers suddenly subject to unionization?

Some of the reasons lie with technological developments in software, which are steadily reducing the body of skills needed by most lower level programmers in most large MIS shops. [CW, July 28]. Workers with fewer skills and less value on the job market tend to have more need for a union to prevent employers from exploiting them.

Moreover, the technological developments come at a time when labor costs form the most irritating and inflation-sensitive component of many organizations' MIS budget.

Whatever the reasons for unionization of MIS personnel, no government agency should effectively sponsor a union's effort to seize control over MIS workers without their consent.

MIS workers who wish to form their own unions or voluntarily join an existing union have a right to do so, but government has no right to mandate that MIS job categories are clerical in nature to facilitate a clerical union's drive to subsume them.

# DATA PAST

### Five Years Ago
### Aug. 27, 1975

LEXINGTON, Ky. — The National Associations of State Information Systems (Nasis) reported a lack of "concrete action" for privacy and security plans. Nasis called the states' failures to establish auditing systems or install security programs for their computer information systems "potential catastrophes of great dimensions."

### Eight Years Ago
### Aug. 30, 1972

MIAMI — The Republicans joined the Democrats in rejecting the idea of a National Data Bank at last week's convention. However, in the Democratic platform, access to all data files maintained on individuals was proposed, while the Republican platform contained no mention of the right to inspect and correct files.

*'Begging Your Pardon . . .'*

# LETTERS

### Unknown Quantity

The contention of Michael Broos [CW, Aug. 11] that the use of free-lance subcontractors is of benefit to clients reflects the cumulative ills of the "body-shop" philosophy. Using free-lancers is unquestionably of short-term benefit to the consulting firm itself; it can satisfy occasional high demand for its services without incurring either the costs of high overhead or the stigma of layoffs in slack periods. Any claim that this is of benefit to the client, however, is a transparent marketing ploy.

Certainly, Broos would not stake the success of a "fixed-price" commitment on the abilities of a free-lancer. Without maligning free-lancers, some of whom are highly skilled and responsible, the fact remains that they are unknown quantities, often retained solely on the basis of an adequate resume, and too frequently brought in by consulting contractors to "pad" the size of a project.

The real test of the quality of consulting personnel comes from "fixed-price" contracts; as long as the client agrees to "cost-plus" (or hourly) types of agreements, the incentive to the contractor is to make the job bigger and more time-consuming, and to bring in every free-lancer he can get his mitts on.

Albert C. Lowenstein
Austin, Texas

### 'Big Brother' Protection

Isn't it interesting that in the struggle between the Labor Department and the Prudential Co. of America over the computer tapes of employee data [CW, Aug. 11], that both parties assume that the records are the property of Prudential. Both assume that employees should be treated as children needing "Big Brother" protection.

Wouldn't it have been interesting and more in keeping with the growing realization that employees are adults to have asked each Prudential employee whether or not he wished the record to be given to the Labor department?

It is probably not too late for Prudential to make the inquiry, although the very publication of this letter may put the situation into the "not invented here" abyss.

Eric A. Weiss
Springfield, Pa.

### Influencing IP Managers

Marcia Blumenthal did a fine job of summarizing a two-hour discussion in 12 column inches in "Application Tools Seen Underused" [CW, June 30]. She left the impression, however, that I thought vendors of application software tools should always go over information processing (IP) managers' heads to the users. This is not the case.

Mathematica Products Group's advertising and main sales thrust are, in fact, directed at IP managers. My main point was that top management should recognize that tools are now available to increase productivity by a factor of 5 to 10 in applications development and that *they* — top management — should ensure that users as well as IP managers employ these tools.

Many IP managers already recognize the value of these tools in bringing the power of the computer to the decision maker and *are* utilizing these nonprocedural/DBMS combinations. At the conference the question was: What is to be done when the IP department is not supporting their use?

In these cases, the software vendor probably does not have much direct influence on the IP manager — but top management does.

Roger L. Sisson
Director, Consulting Services
Mathematica Products Group
Princeton, N.J.

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HUMAN CONNECTION/Jack Stone

# When Is a System Ready to Be Released?

You'd think that, after the passage of so many years, all of us would have learned by now that the old saw, "It's better to give the users something than nothing at all," is no longer operative.

Yet, just a short time ago, the DP manager of a major installation told me privately how he was forced into the premature release of an internally developed system because "the schedule just had to be met."

Obviously, there are certain sets of organizational and operational circumstances that in the heat of the battle, may help managers rationalize such decisions in their own minds. These circumstances usually relate to the commitment of substantial resources that are involved with the operation of the new system, such as terminal equipment standing ready on the floor or newly trained people arriving on the job — and a senior executive closely monitoring the situation to make sure these resources are being fully utilized.

Clearly, DPers in this situation solve certain political, short-range (or even personal employment) problems by releasing a system "on schedule," even though it's not fully debugged or documented or otherwise "undone." And since, these days, just about everybody knows that no software system is ever perfrect, these DPers can claim that the "complexity of the system is so great, that we will be straightening out bugs for months to come."

### User Backlash

I wonder sometimes if DP managers really appreciate the full extent of user backlash that builds when a newly developed system doesn't perform to user expectation. One level of the problem is a major deviation from system specification where users complain that their needs are not being met. This condition is bad enough but, to soften the blow somewhat, it can be attributed to a failure of human communications, which has the aura of mutual responsibility about it.

Another level, which has more serious implications for the DPer, is the case where users say, "The system just doesn't run right." This expression translates into a system which, by user standards, is difficult — or impossible — to operate or use or understand.

Here the users reject any notion of mutual problems, communications or any other. They feel the responsibility for system operability, usability and comprehensibility clearly belongs to the DP organization. They believe these are matters involving state-of-the-art techniques and methodologies which simply cannot be spelled out in a system specification and must be taken for granted. What's more, even a perceived failure in any of these areas reflects in the minds of users as a failure in technical performance by the DP organization.

This last point cannot be overemphasized. If there is one attribute about us DPers that impresses the outside world, it is our reputation for technical competence — and deservedly so. We can make our machines turn cartwheels and spit roofing nails, and we're doggone proud of it. But for the life of me, I can't understand why some DP managers put this supremely important quality — their technical reputation — on the line by releasing a system that, in their hearts, they know is not ready for the user.

One can argue that certain short-term exigencies must supercode long-term image considerations, and that if the product is due out, then out it must go, ready or not. Well, there are trade-offs, I guess, but I have difficulty supporting the position of releasing a not-quite-done product.

### System Documentation

User documentation is a classic example of what I'm referring to — a problem area that will be with this industry until every system is screen-oriented, menu-driven, self-directing and self-teaching.

All but a few DP managers have cut corners on this documentation and turned out what they knew to be an inferior product. Of course, their argument is this one: "Now look. I've got a trade-off situation. Should my limited staff of programmers be spending their time writing code or writing manuals? You know the answer."

Sure, we know the answer. The documentation gets short shrift, which helps all those users — who have a history of judging the quality of a system from its documentation — reach a quick and negative conclusion about the level of technical excellence within the DP organization.

SOCIOLOGY OF COMPUTING/Robert L. Glass

# Life Can Get Complicated In Software Tools Business

When Sean Hammer got into the software tools business, he had no idea that life would get so complicated. But it did ... and those complications eventually led to a project which failed.

What are software tools, I hear some of you out there asking? Well, a software tool is a computer program used by a programmer to help him build other programs. Like a compiler or a loader, or perhaps a text editor. A software tool builder, in short, is kind of a programmer's programmer.

When Sean emerged, symbolically fuzzy-cheeked (and actually heavily bearded) from the ivy-clad halls of P.Q. Aresti U., he had been assigned, like any other new computer science graduate, to the world of application programming. It was only after a couple of years of application apprenticeship that he moved in to the support tools group of his employer, Copy Cat Xeroexgraphics.

Most of the tools Copy Cat programmers used came from its hardware vendors. If it used a Hobby Horse H-8000 micro in one of its sophisticated copiers, then it would use the compiler and assemblers and linkers that Hobby Horse had on the shelf, ready to deliver. Sometime those tools had been built by the vendor or by a software house under subcontract to him, and sometimes they came from the Hobby Horse user's group. No matter — either way, Copy Cat used vendor-supplied software whenever it could.

Some of the other tools Copy Cat used were purchased on the open software market from companies which had built them to make a profit. Again, whenever Copy Cat could, it begged, borrowed, bought or stole tools-type software. It was only as a last resort that it developed tools in-house.

That meant that Copy Cat's software tools group was pretty small. In fact, when Sean joined it, it constituted a 50% increase in the size of the group. (No, it is *not* required that readers of this story figure out how many tool builders Copy Cat has!)

### Software Reliability

The problem that prompted the dramatic increase in the size of Copy Cat's tools group was software reliability. It was essential to Copy Cat that software never be the cause of failure for a Copy Cat copier in the field. Sean was brought aboard to build some tools to promote the reliability of the corporate application software.

A quick survey of the reliability literature told Sean that he had a formidable task. Sure, there were lots of claims that tool A could increase company B's software reliability by C percent. But by applying a little educated intuition and common sense, Sean knew that most of those claims were exaggerated. Like other areas of the computing world, there were a lot more paper reliability tigers than there were real ones.

Still, Sean was able to identify a few particularly promising candidates for Copy Cat software reliability tool development. None of them were panaceas, but each could carve out its share of potentially more reliable software. For his first tool, Sean chose to build a Test Coverage Analyzer.

*(Continued on Page 40)*

THE TAYLOR REPORT/Alan Taylor

# 'Mystery' Arbitrator To Rule on NCR Documents

"Kevin Mahan, where are you?" is the latest question in the struggle between NCR Corp. and one of its disgruntled users, Perl-Mack of Denver. Closely behind comes the question, "And for whom do you work?"

The reason for the question is that neither the Cerritos, Calif., telephone book or lawyer's reference guides list him. Nor do they list the company for which he is said to be Western regional manager, Computer Services, Inc. And obviously, if he or his company, which apparently could be a software supplier, uses contract terms semiliar to those whose validity he is to arbitrate, then the question of unfairness will certainly arise.

It is quite possible, of course, that this is simply a matter of American Arbitration Association's records not being up-to-date, of unlisted phone numbers and other items. Still, it does introduce another twist into arbitration proceedings that were already developing into a battle between the two sides even before the arbitrator was chosen.

Mahan was never on any of the American Arbitration Association lists that were circulated to NCR or Perl-Mack. The first list — all Colorado attorneys — was turned down flatly by NCR, claiming that they were not knowledgeable in data processing. To support this, NCR cited the contract clause that said the arbitrator should be chosen from a panel of people knowledgeable in business information and DP systems.

The American Arbitration Association granted this and circulated a very different list: Only one lawyer, no one from Colorado at all, and people from time-sharing companies, university engineering departments, personnel agencies and so on.

The lawyer did not specialize in computers and made no claim to knowledge in the area — merely that he had litigated regarding computers in some way.

Perl-Mack struck back, using the NCR defense to its claim to buttress its statement that no one on the second list was acceptable, and that someone able to handle purely legal issues was clearly necessary because the question of consequential damage rights was in dispute. Therefore, Perl-Mack told the American Arbitration Association, a wider search was necessary to ensure fairness.

The American Arbitration Association agreed, but also stopped giving any choices to the parties. Mahan was nominated out of the blue, and a Sept. 22 date was set for a pretrial conference.

It seems that the pretrial conference can bring into focus for computer users the fact about the subpoena power over documents, which Paul Hoffman recently urged here as being an advantage when users fight with vendors.

The Perl-Mack dispute is based upon NCR's alleged failure to in-

*(Continued on Page 34)*

# 'Mystery' Arbitrator to Rule in NCR Case

stall a property management system as it had promised to do for a listed price of $5,000 back in 1977. At issue is whether the property management system was just one part of a data base system including accounting data, or whether the two were thought to be independent systems, so that the terminal in the property management area would simply not be used, but stand quiet, while the payroll or other accounting functions were run.

### Best Documentation

Some of the best documentation that can exist to determine whether a data base system was contemplated will probably be outside Colorado, in Dayton, Ohio, at NCR's headquarters. This is because the Universal Agreement explicitly gives NCR Corp. the right to reject user-signed agreements originally prepared by NCR branches if the hardware/software combination appears impractical.

Presumably, headquarters got some documents that described the proposed system. Other documents that can shed light on these situations are apparently in the hands of two Denver NCR subcontractors — the original one, Dynamic Systems Corp., and the second, Omega Information Systems, Inc. — or perhaps with the original programmer, Dale Denny.

Other documents the user may request could be ones dealing with NCR's intentions and its assessment of the meaning of the Universal Agreement itself. These might include documents indicating whether definitions were knowingly left out of the agreement, documents by Ben Olive or others explaining the agreement, and even perhaps analyses of Olive's letters to *Computerworld* and of these columns on the NCR paper.

### Court Fights Possible

Mahan's background is particularly interesting here because of the one-sidedness of his powers. On the one hand, if he rules for NCR and refuses to subpoena the documents, then that is final. It is a part of the arbitration process, and the user tried and lost.

But if he rules for the user, that can be something else entirely. NCR can fight the whole issue over again in the Ohio courts, if it chooses to do so. All sorts of legal questions can arise, such as whether arbitration is litigation, whether the documents are identified with specificity (often nearly impossible), whether they are relevant and so on. Not to mention the out-of-state reach of the arbitrator's subpoena, and any technical faults that can be claimed.

### Getting Papers

Even within Colorado, getting necessary papers may become court cases. Dynamic Systems Corp., Dale Denny and Omega Information Systems, Inc. may, or may not, force court challenges if Peri-Mack wants to see their papers — as is quite likely — to find out both what the system contemplated was and whether NCR really has used its best efforts to install it.

### Evidentiary Problem

The evidentiary problem of what the intended system was, and particularly whether the property management system was to be on-line with the accounting system, is clearly crucial to the fight about consequential damages. NCR is claiming that the Universal Agreement holds, but under Colorado law such limitation of liability clauses are replaced by standard UCC liabilities where "circumstances cause an exclusive or limited remedy to fail of its essential purpose," or where exclusion is unconscionable.

If, in fact, what is happening is that NCR is asking payment while only delivering half a contracted for data base capability — like giving only half an encyclopedia — then it is very different from delivering five out of six separate systems. But that, and much more, is now for the arbitrator.

So, Mr. Mahan, you have plenty to do on this matter, wherever you are. The fairness of arbitration looks as though it may be tested through your actions. May it not be found wanting.

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# LETTERS

## PL/I Alternative

As a computer science student at the University of Houston, I have studied Cobol, Fortran and PL/I. I was both interested in and amused by Howard Fosdick's In Depth article comparing Cobol and PL/I [CW, Aug. 11].

I was interested because I realize that when I get into the "real world" I will probably have to use Cobol, even though I consider it to be absolutely archaic; amused because Fosdick was so timid in his endorsement of PL/I.

While it may not be The Definitive Computer Language, from my (admittedly limited) point of view I see PL/I as infinitely better than Cobol. Programs in PL/I are concise, structured and efficient, whereas in Cobol they become rambling and sloppy — seeming to go in all directions.

At any rate, I want to thank Fosdick and *Computerworld* for giving Cobol advocates an alternative to consider.

Nancy J. Mackin
Houston, Texas

READER COMMENTARY/Arthur Pfeiffer

# Symbolic vs. IBM Issues Still Unanswered

On July 1, 1980, the U.S. Court of Appeals for the Ninth Circuit handed down an 11-page opinion in the software antitrust suit entitled Symbolic Control, Inc. vs. IBM reversing the trial court's dismissal. The article, "Symbolic vs. IBM Continues Software Pricing Debate" [CW, July 21] is incomplete and at times inaccurate.

1. Contrary to *Computerworld's* statement that "for all real purposes [Symbolic] went out of business in 1971" and "Symbolic never won a customer," from April 1972 to April 1974, Nasa's Ames Research Facility leased Symbolic's APT/70 for $1,000 per month. Although the Nasa lease is not mentioned in the opinion, I told CW about it in a telephone interview.

In addition, from March 26 through November 1971, ROHR Corp., on a trial basis, leased APT/70 from Symbolic for computer time in lieu of money.

2. I told CW that in September 1974 Symbolic filed its pretrial statement with the court specifying trebled damages of $189 million through 1978. For CW to report that "Symbolic, in its trial papers, said damages included $1.2 million," and then, "Those damages were subsequently estimated through 1978 to be $63 million, said Arthur Pfeiffer," creates the false impression that Symbolic's actual damage claim is $1.2 million and any larger sum is only the expression of my current subjective wishes.

3. CW reported this case as though it dealt only with acts committed by IBM "after IBM unbundled software in 1969." However, Symbolic charges that IBM failed to price software and related services (including APT) both before and after IBM's June 1969 unbundling announcement.

The Ninth Circuit understood this and held that Symbolic (incorporated in March 1969) could have been injured by the continuing "adverse competitive effects" of assumed violations committed by IBM prior to Symbolic's business existence. Accordingly, IBM is legally accountable for earlier violations which caused later injury regardless of IBM's trial defense that "'plaintiff knew,' before entering business, about this or that aspect of IBM's marketing." IBM's "public domain" defense is contradicted by its own documents, some of which Symbolic did not discover until after trial, but which are now in the court record. They show that as late as 1972: a) IBM gave its customers NC360 Systems Manuals labelled "Restricted Distribution"; (b) IBM selected users to test new NC360 releases prior to general distribution who signed IBM nondisclosure agreements declaring the NC360 material to be IBM "confidential and proprietary"; and (c) in February 1972, IBM released for a $500-per-month price (12-month limit) its "free" 1971 NC360 model modified to run under the CMS time-shared operating system without general interactive APT processing.

The Ninth Circuit recognized the critical effect of price or, more accurately, no price, on a buyer's decision to choose a free product over a priced one. Even assuming that IBM's free NC360 software was superior in quality to Symbolic's priced APT/70 software (a factual dispute to be resolved in future trial proceedings), the Ninth Circuit concluded: "We hold that, on this record, IBM has not demonstrated that Symbolic's losses were unrelated to conduct of IBM."

For years, to the best of my knowledge, this case has been the only private software antitrust suit against IBM. Although filed on Nov. 16, 1971, this case has never been mentioned by IBM in its annual reports to shareholders.

A judgment in this case finding IBM guilty of monopolizing and foreclosing competition in separate software markets via predatory pricing and an illegal tie-in between hardware and software could greatly affect the entire computer industry.

*Pfeiffer is president of Symbolic Control, Inc. of San Francisco, Calif.*


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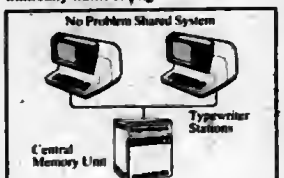
The No Problem Billing Smart Disc will even keep track of your firm's timekeeping.

**The No Problem Shared System™**

The No Problem Shared System offers you even greater typing capabilities.

The heart of the system is the Central Memory Unit. It can store up to *30,000 pages*, giving you lower storage costs per page, and saving you time by eliminating the need for secretaries to handle numerous discs.

The No Problem Shared System incorporates such advanced features as automatic repagination, list merging, global search and replace, statistical typing, standard document assembly, and the ability to make line drawings and charts right on the screen. It also allows you to type, edit, and print multiple column formats and automatically number pages.




The No Problem Shared System adds new capabilities to the already versatile No Problem concept.

The No Problem Shared System's screen will display 256 different characters, including Greek and math symbols.

You can start with one or two typewriter stations connected to the Central Memory Unit, and add typewriter stations or printers as your needs increase.

And, because the No Problem Shared System is compatible with many computers, they can "talk" to each other by exchanging information.

No Problem Shared System printing approaches typeset quality and flexibility. Proportional and bold printing, to fit any format or width, is easily done. Even in two type styles and two colors on the same page at the same time.

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READER COMMENTARY/Constance Pollack

# 'Big-Name' Firms Guilty of Unethical Acts, Too

I have been a computer consultant for many years working closely with a large number of software houses and user firms in the U.S. and abroad, and I have been exposed more times than I care to think about to practices which range from shady to downright unethical to entirely dishonest. And lest one thinks that such dealings are carried out by small struggling firms who might cry the proverbial, "I've got to compete against the big-name firms," let me inform you (if you don't already know) that many of the guilty parties are from those big-name companies.

Before you read any further — if you are one of those people who say that's the way of business and that I am naive to think that it can be changed — stop reading this article! Maybe you are right. Maybe kickbacks, unqualified workers at exorbitant rates, inept or nonexistent system design, poor treatment of the user's level of knowledge and so on are doomed to be with us forever.

Maybe, but I don't think they have to be to the degree to which one confronts them today. Are they everywhere? No! Would business fall apart if the practices ceased? No! Who suffers as a result of these practices? Everyone!

How does it all happen? Let's start at the beginning — initial contact for a project between consulting firm or individual and the user representatives. In many cases this has been facilitated by recommendations of business associates who have had good experiences with the particular consultants or by hardware vendors who have had past success with certain firms. This is probably the best first move one can make.

If no recommendations have been made, then one asks around and usually comes up with names of some of the larger firms. This is a feasible method if one remembers at all times that larger does not necessarily equate with better.

Then we have the "clinker." This is the case where extra inducements are proffered by the consulting firms' salespeople working on the account. I have personally been aware of money, trips, sexual presents and employment of the user's children by the winning consulting firm offered as little extras to secure contracts. And I'm sure if I were to ask other people involved in the computer industry to augment my list, it would become quite long. I am saying this not to show diversity in gifts but the extent to which this practice is used.

Now that we have exposed the consulting firms, let us look at the other side — the user. Are all users looking to find the best people to perform the assignment? Some certainly are. But there are a large number of user personnel who treat this as a secondary concern. The main concern is, "What's in it for me financially?" I do not have enough finger and toes to count the firms within the public and private sectors of industry representing among others, government, health care, banking and public utilities that engage in such practices.

You might ask, "Did the users' type of behavior cause the consulting firm to act in an unethical manner or did the consulting firms' unethical inducements sway the user to depart from good business sense?" My answer is all of the above. But at this point it does not matter anymore. The goal is to correct the situation and not to pass blame.

### More Pitfalls

Let us go on to the next step. Assume that a fair selection of potential consultants or consulting firms has been made. Next an RFP and/or meetings to glean the desired information about the hardware and software requirements of the user should follow so the consultants can make a realistic and reasonable bid of cost and time to complete the project. In many cases, to the user's detriment but prompted by the user itself, there is its insistence on completely unrealistic timeframes.

The consultant can take one of two approaches. He can argue that there is no way to complete the job within the terms the user wants; and if he cannot convince the user of this, he will walk away from the contract. The other approach, unfortunately, is to lie.

On a fixed-price contract, lying results in some hazards. But a "shrewd" company can get around even this. And on a T&M contract, the consulting firm knows that it has no problems. Once it begins work, even if there are delays beyond a reasonable norm, the user knows it will be more costly and time-consuming to change company in mid-track.

The outcome is to reward dishonesty and often to produce an inferior product. The latter should be expected since the type of firm engaging in such practices is usually not above using shoddy methods.

So once again I say that unethical behavior is not confined to one side or the other. It results from both sides trying to get the best of the deal, and ultimately all sides lose.


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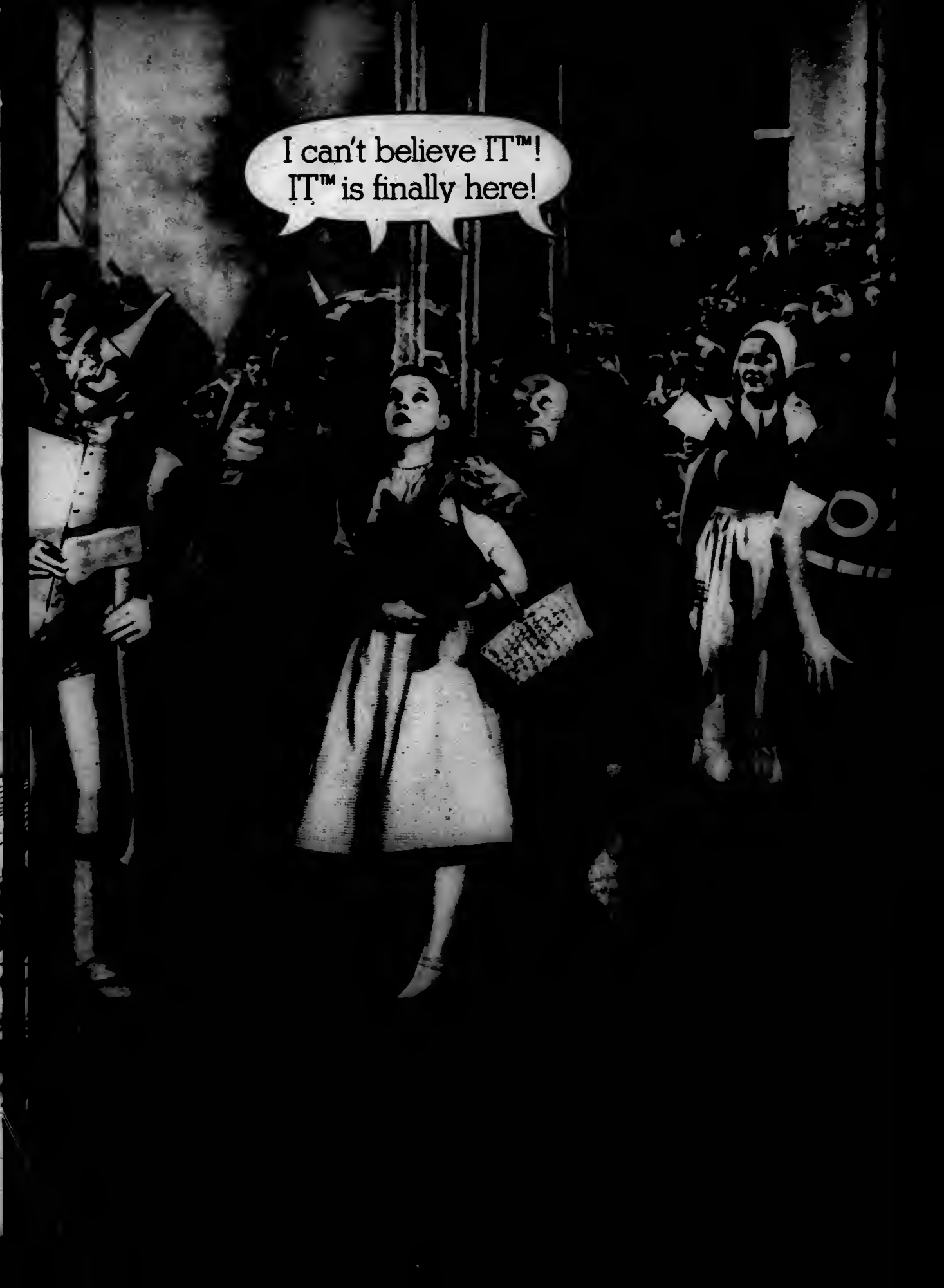
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Each page has the following independent page characteristics: protect, program mode and cursor retention. And when you change from one page to another, these characteristics are stored in memory to be recalled at another time, letter-perfect.

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With IT, specific areas are designated as protected fields. They can't be typed over unless you remove the terminal from the protected mode. Even your remote computer can't overwrite the protected fields until IT is removed from the protected mode. Back-

# The Intermediate Term

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ground (protected data) can be displayed at a lower intensity, while foreground is displayed at normal intensity and may be modified. You can even tab the cursor forward and backward to the start of each unprotected field.

And when you depress IT's special function key, a special function sequence is transmitted. The remote computer is then in full control. And all control functions that can be initiated from the keyboard can also be executed from the remote computer.

Also on IT, full or half duplex operation is switch or keyboard selectable. You can also choose from conversation or block transmission, which can be initiated by you or the computer. In block mode, a line, a message or a page can be transmitted in its entirety.

## IT is a dream.

IT's editing capabilities allow you to clear the screen, or use the cursor for a character change. In addition, IT comes complete with character insert and delete, line insert and delete, erase to end of line/field/screen, and tab and back tab. IT's full controls also allow you to skip protected fields, backspace, forespace, move up, down, return, home, and new line.

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# inal from Lear Siegler.

# LETTERS

## Reasonable Checks

The area of "reasonableness checks" in data processing is not new. Many banking programs routinely check that deposits and withdrawals are within reasonable bounds. Such checks might include questioning cash deposits or withdrawals of more than a set limit, or checks of $100,000 where the average balance has been $500.

However, I recently discovered that although, some billing organizations are making such checks, not all are.

My encounter with the billing department of the local telephone company (Mountain Bell) began when I received a closing bill for 5 cents for my residential service. After noticing that the bill had 13 cents of postage (presort rate), I began to question the value of the bill. A telephone conversation with the head of the billing department revealed that I was indeed required to pay the 5 cents if I ever wanted telephone service again.

Determined to get back at the phone company, I returned the bill together with a check for 7 cents, (which was promptly cashed — the transaction no doubt cost both Mountain Bell's bank and my bank more than 7 cents each.) About two weeks later, another notice from Mountain Bell arrived, thanking me for my payment and enclosing a refund check for 2 cents. Once again, the envelope was marked with 13 cents of postage.

I suspect this experience is not at all uncommon. To the computer professional, it is amusing that Mountain Bell spent several dollars (including labor, postage and processing charges) to collect 5 cents. To the layperson, however, this has more important consequences. For some, this will fuel suspicions that computers are unreasonable and, rather than simplifying life, make it more complicated.

If there can be a moral to such a story, it would be that more programs and programmers need to be concerned that the data being processed is reasonable. In a profit-making enterprise, one should not spend dollars to earn cents!

Jeremy Epstein
Albuquerque N.M.

## Unruly Computers?

What starts out as straightforward computer documentation often contains unplanned meanings. Even the most innocent technical paper or manual can provide its share of humor through mischoice of words.

Although the word behavior properly may apply to an object, its more common usage is in reference to a sentient being.

In a recently released manual on computer systems software implementation, a major mainframe manufacturer included the statement, "Common routines . . . ensure standard behavior of code."

Does this mean present-generation computers are already learning on their own, perhaps stealing third-digit overflow on the arithmetic bus, maybe taking a few extra nano-smoke-breaks between main and virtual storage, or worse dancing to the megabyte beat of data transfer from disco-storage?

As the computer gets older and smarter, will "common routines" be sufficient to control behavior?

The day may not be far away when hardware diagnostics will have to be replaced by "psychological profile testing" and engineers will be trained to perform logic-lobotomies and main-storage rehabilitation seminars.

Don't say you haven't been warned.

John E. Trybus
Miami, Fla.

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# Software Tools Business Has Its Complications

*(Continued from Page 33)*

Now a Test Coverage Analyzer is a fairly complex kind of tool. By means of an analyzer, it is possible to find out how well particular piece of software has been tested. For example, do the test cases being used cover 50% of the logic of the program? 75%? Or, hopefully, 100%?

To get that kind of data, the Test Coverage Analyzer rigs the program being tested so that it measures itself while it executes. The analyzer actually introduces extra code — called "instrumentation" — into the program, which causes it to bump a count every time each segment is executed. At the end of the run, the instrumented program prints out those counts, and flags unexecuted segments.

Pretty tricky, the first tool Sean chose to build. But an intellectual challenge worthy of a newly named tool builder!

### New Copier Line

Now it chanced to pass that, while Sean was developing his analyzer, Copy Cat made an early announcement of a whole new family of copier machines. And at the same time, let a contract to a well-known systems house, Sysboomba Systems, to develop the integrated software and computer hardware for the new line.

Sean was overjoyed. For one thing, the new task was perfectly timed to be the first application of his analyzer. For another, Sysboomba was well known as an innovative company when it came to using advanced concept tools.

In fact, Sysboomba employees probably wrote at least a fourth of the articles in the software engineering journals on the development of modern programming methodologies and tools. The analyzer would be amply allowed to demonstrate its value, Sean felt sure.

### Verve and Enthusiasm

Whistling while he worked, Sean completed his analyzer with verve and enthusiasm. The world was waiting, Sean believed, for his analyzer tool. With it in use, both Sysboomba and Copy Cat technologists and managers alike would have a whole new visibility on the testedness of the new software. Sean could hardly wait to appear on the Sysboomba doorstep, analyzer in hand, and watch their expression of surprise turn to joy as he handed his new treasure over.

### Change in Demeanor

But something went wrong when the fated day arrived. Far from turning to joy, Sysboomba's demeanor became distant, then outrightly hostile. Stunned, Sean pressed the Sysboomba software folk for an explanation. Slowly, the picture emerged.

For one thing, Sysboomba told Sean, its contract didn't call for the use of an analyzer. Using such a tool was an unwanted intrusion, a perturbation on its already planned schedules. For another, Sysboomba was threatened by the idea that anyone planned to be able to look over its shoulder and evaluate its software testing process. That's our turf, it told Sean clearly — and keep your analyzer off it.

"But," sputtered Sean, "what about your reputation as an innovator? The literature virtually reeks of Sysboomba's new concepts. Aren't you intellectually curious about using the analyzer?"

The answer was one Sean was totally unprepared for. It left him essentially with no ground to stand on.

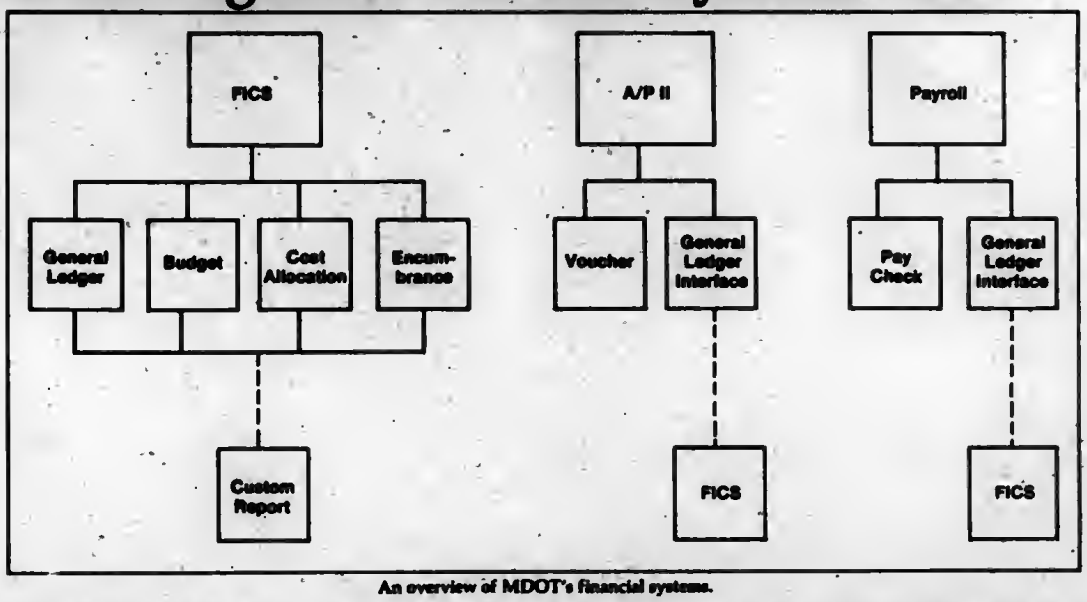
"Oh, sure, we build a lot of tools," the Sysboomba spokesman said. "And, sure, we write a lot of papers on them.

"But we never use them on our own software development acitivities," he concluded. "They're purely for sale."

It's a shame Sean Hammer's introduction into the software tools world was such a harsh one.

The reality of a project that failed was something he'd never in his wildest dreams considered. But there sat his shiny new analyzer, slowly rusting with disuse, as the biggest Copy Cat software job of the decade went to completion — without it.

# Seven Agencies' Finance Systems Tied




An overview of MDOT's financial systems.

BALTIMORE — If all the Maryland Department of Transportation (MDOT) faced was a task of implementing an automated financial system in three years' time, it might have developed the software in-house.

But because that system had to accommodate seven different MDOT operating entities whose individual financial systems were compatible only to the extent that they conformed to State Department of Budget and Fiscal Planning requirements, MDOT decided to consider purchasing applications packages.

Further compounding the task at hand was that MDOT was receiving $40 million to $45 million in federal funds, which would be cut off it it did not comply with accounting system requirements of Section 15 of the Urban Mass Transportation Administration by the three-year deadline date.

Back when MDOT began working on the project, the financial systems used by its seven operating bodies "were really fragmented," remarked Pauline Covino, financial systems design and control manager. Three of the seven agencies keep two sets of books — one for normal business and one for state requirements. The other four operate as state authorities only.

"The accounting functions for some administrations were completely manual, some were being automated and others were live on the computers at individual administrations," Covino recalled.

Before deciding to tie these "uncoordinated" systems together through packaged software, a task force consisting of the senior financial officers of each of the seven agencies was formed to do a preliminary investigation of how best to tackle the project.

Under Covino's direction, they listened to subcommittee presentations on the major functions of accounts payable, general ledger, budget and accounts receivable at each agency and reviewed the available financial software packages through face-to-face interviews with vendors.

Their findings boiled down to a

*(Continued on Page 42)*

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Wrong. Did you give any thought to how the new arrival will impact your organization? Some considerations:

- How do you establish the management function necessary to control the data base? Often, a new department must be created and directed by a data base administrator (DBA).
- How does this department fit into the organizational hierarchy?
- What should be the role of the DBA?
- To staff that department, must you hire hard-to-find and expensive outside expertise or can you draw from in-house personnel?
- How do you train employees to work with the DBMS?
- How do you ease their transition to working with the new vocabulary, different access methods and different backup and recovery techniques a DBMS requires?
- How do you plan for and ensure data independence, integrity and security?

A *Computerworld* Special Report on DBMS will attempt to explore these and other issues relating to the selection, implenentation and organizational impact of DBMS software. Contributed articles on user experiences, technological trends, product comparisons and evaluations and on what the future holds, are welcome.

Please send articles — along with any charts or graphs — by Sept. 30 to Marcy Rosenberg, *Computerworld*, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

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*For Business Programming*

# Microcobol Fits 16-Bit DEC Gear

LONGWOOD, Fla. — An operating system and business programming language for all Digital Equipment Corp. 16-bit processors is being offered by Microbol, Inc. The Microbol operating system takes advantage of DEC's VT-100 CRT terminal and is optimized for floppy disk handling, including loam sorting, the firm said.

Microbol is self-contained, incorporating its own multiuser operating system and language processor, and is memory resident, requiring no overlays; all disk space is available for data and application program segments, according to the vendor. The programmer can construct his own higher level commands, the firm said.

The Microbol operating system is licensed for $1,500 per machine from Microbol, Inc., Box 3384, Longwood, Fla. 32750. Each business application, including source listings, is priced at $500 per customer from Microbol Applications, Inc., CDS Computer Store, 6905 Atlantic Blvd., Jacksonville, Fla. 32211.

# Seven State Agencies' Packages Meshed

*(Continued from Page 41)*

recommendation to procure software systems for general ledger, budget and voucher payable accounting functions — namely, Release 19 of Management Science America, Inc.'s (MSA) general ledger and accounts payable system.

Since MDOT, as a state agency, cannot write checks, MSA provided the necessary specifications for converting its accounts payable system into a voucher payable system.

### Selling the System

The next challenge was to sell the numerous using departments on the systems which, according to the task force, could only be accomplished by involving users in the implementation. To foster their user involvement philosophy, task force members assigned a project leader and two technical assistants from each agency to the mission, with the understanding that each project leader would take charge when his organization was to go up on the system.

Project leaders worked directly with Covino and the systems accountant responsible for the general ledger system, plus they served as liaisons with their working level groups.

In this way, each agency's needs were met. For example, when MDOT originally acquired State Aviation, that agency was required to convert from a totally automated system to a totally manual system, a "traumatic" transition, as Covino remembered. To avoid the same negative experience this time around, the task force decided to bring State Aviation up first on the MSA system.

Training procedures were also geared to making the transition to the MSA system as painless as possible for all agencies. The task force held formal training sessions based on MSA's audio-cassette lessons and associated workbooks which were distributed for each system.

And as each agency goes on the system, an accounting manual is compiled that contains control and processing sections, a section on each agency's chart of accounts and a glossary that combines MSA, state of Maryland and DOT terminology.

The general ledger system has been installed at the State Aviation Administration and at the Mass Transit Administration, and Covino terms MSA's support "more than adequate."

Now successfully converted to a voucher payable system, MSA's accounts payable system has also been implemented at these two agencies. A general ledger interface is planned to link this system and the MSA payroll system acquired by the Maryland Central Payroll Bureau in September 1978.

Down the road, MDOT intends to convert to Release 21 of the general ledger system — when it becomes available for the agency's Burroughs Corp. B6700 hardware — to enable the State Highway Administration to convert to the MSA system and take advantage of the expanded field sizes.

# ADP Network Offers Customized Budgeting

ANN ARBOR, Mich. — ADP Network Services is offering a computerized budgeting service that reportedly automates the budget preparation and implementation process.

The service is said to cover all common budgeting requirements, and can be customized to meet an individual firm's needs.

Features include automatic roll up, multiple consolidation paths, exception reporting of variances, automatic error checking and computer-generated work sheets for budget center managers, the firm said.

The service costs $3,000 to $7,000 to install and between $500 and $2,000 a month, depending on how much it is used, the firm said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.

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# Enhanced Ansi Compiler Serves HP 1000s

PALO ALTO, Calif — Hewlett-Packard Co. is now offering an enhanced Ansi Fortran 66 compiler for HP 1000 computer systems.

Designated HP Fortran 4X, the product is a subset of Ansi Fortran and includes extensions compatible with other minicomputers' Fortran 66 compilers. In addition, it is upwardly compatible with HP Fortran IV, which remains an HP 1000 system option.

Fortran 4X performs local optimizations of the object code — improving efficiency of operation and economy of resources, an HP spokesman claimed.

Its capabilities include constant expression folding, subscripting optimizations, branch structure optimization and improved register allocation, he said.

Compilation speed is as high as 3,000 line/min, and the product can compile programs using a partition as small as 13K words. With a 28K partition, it can compile programs containing as many as 5,000 line/min.

Other features include double-word integer and double-precision real data types, IBM and Ansi Fortran 77 direct-access I/O, IF-THEN-ELSE, arrays of seven dimensions, embedded comments, bit shift function and lowercase for improved readability.

Fortran 4X is priced at $1,000 and the copying fee is $400, the vendor said form 1507 Page Mill Road, Palo Alto, Calif. 94304.


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*No Need to Convert Source Code*

# DOS-to-OS Transition Updated

DALLAS — University Computing Co. has unveiled Release 4.4 of its DOS-to-OS transition system, UCC TWO.

UCC TWO allows DOS programs to be moved into OS production without conversion of source code and assures their continuing operation. Any release of DOS, DOS/VS or EDOS is supported by UCC TWO under any release of OS or OS/VS, the vendor claimed.

New facilities have been added to extend the level of UCC TWO's support and allow improved usage of OS features by DOS programs.

Among the Release 4.4 enhancements are:

- A file reblocking facility for improved storage utilization — sequential files are reblocked via JCL without requiring change to DOS source programs.
- Support for DOS/VSE program products, including DOS/VSE sort packages, compilers and PL/I.
- Support for native DOS Rotational Position Sensing (RPS) for faster disk seek time, in addition to previously existing support for OS RPS.
- Optional one page abend dump summary containing key debugging information in easy-to-read format to simplify resolution of program problems.
- Support for hard-coded Vsam control blocks.
- Linkage editor improvements for processing DOS PL/I optimized programs.

In addition, new user documentation is available. All documentation has been reformatted and revised, following recommendations received from a panel of UCC TWO users.

UCC TWO is available on an unlimited license for $30,500 or a limited lease arrangement for $1,100/mo, from UCC Tower, Exchange Park, Dallas, Texas 75235.

# DEC Gear Gets Forms Entry

MINNEAPOLIS — The E-Code Forms Entry System, a comprehensive high-level language with software tools for developing forms and intelligent data entry applications for Digital Equipment Corp's. PDT family, the LSI-11 microcomputer and PDP-11 minicomputer systems, has been introduced by MCPC Systems.

Consisting of a package of programs and applications routines that allow easy development of user written form and data entry applications using the DEC VT100 terminal in a PDP-11 environment, E-CODE operates under the RT-11 operating system and allows multiterminal applications execution under the single-job monitor of RT-11, RT² and RT²/PDT, the firm said.

The system can execute application programs written in E-CODE at any of four VT100 terminals independently and is compatible with DEC's FMS-11 through a special interface enabling form creation directly on the screen.

E-CODE provides throughput rates to VT100 displays allowing screen draw speeds up to four times faster than other FMS-11 applications. IT also provides nearly unlimited error checking on individual fields and complete management of operator-controlled interrupts, the firm claimed.

The system's components include a compiler, an interpreter and a library file decoder. The standard distribution package costs $800 on a per-CPU license basis from MCPC Systems, Suite 220, 2344 Nicollet Ave., Minneapolis, Minn. 55404.

# IMSL's Library Edition 8 Lists Set of Subroutines

HOUSTON — Edition 8 of the International Mathematical and Statistical Libraries, Inc. (IMSL) Library, a set of mathematical and statistical subroutines written in Fortran, is now available.

Edition 8 has been expanded and includes nearly 500 subroutines, increased capabilities for handling larger linear programming problems, 10 additional subroutines to the Random Number Generator Chapter and calculations for solving Fast Fourier Transforms of two- and three-dimensional arrays, the vendor claimed.

Large computer users are charged $1,600/year for use of the library, while minicomputer users must pay $1,400, the vendor said. Universities are granted a 25% discount.

IMSL is located at Sixth Floor, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

# AID to Repeat Seminar Series

OAK BROOK, Ill. — Applied Information Development, Inc. (AID) will repeat its productivity improvement seminars in Chicago, Milwaukee, New York and Hartford, Conn., during August and September.

The seminars will focus on quality assurance and its role in Aid's productivity improvement program.

More information is available from Aid's branch offices in the scheduled cities, or at the home office at 823 Commerce Drive, Oak Brook, Ill. 60521.

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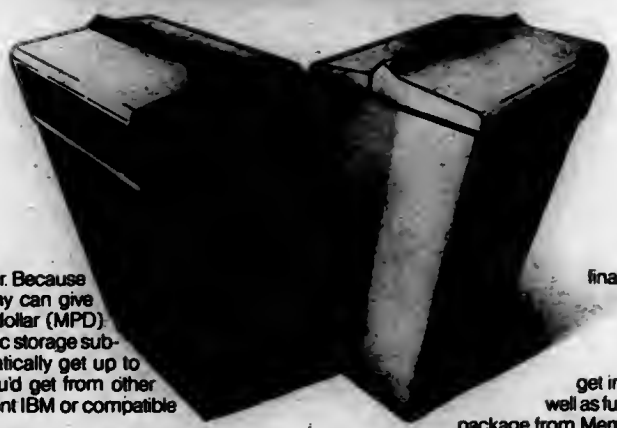

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# Graphics Support System Gives Device Independence

SAN DIEGO — A high-level, general-purpose computer graphics support system that reportedly provides computer and device independence in a graphics development package is now available from Megatek Corp.

Template was designed to handle dynamic and static applications in two- and three- dimensional environments, the vendor claimed.

Features include 2D and 3D line drawing and text generation using high-level Fortran functions, user-definable viewing environments, structured archiving of graphic objects, general axis generation, color definition and selection display of 21 character fonts and a virtual display surface capability.

The package is usable on any 24-bit or larger processor and with any commercially available graphics terminal device, according to a Megatek spokesman.

It may be leased for $1,000/mo plus an installation charge of $4,000/computer system.

This price includes the first month's lease payment as well as on-site classroom instruction, manuals, documentation and the use of a telephone hotline for consultation.

Megatek is located at 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

# *Graphics Package Provides Fortran Plotting Capabilities*

MANHATTAN BEACH, Calif. — Syscon Design, Inc. has unveiled a graphics software package that provides basic Fortran plotting capabilities for Digital Equipment Corp. PDP-11 minicomputers and Tektronix, Inc.-compatible plotters or terminals.

The GP-10 package operates under DEC's RT-11, RSX-11X or IAS operating systems and can be used, for instance, with a Lear-Siegler, Inc. ADM-3A terminal outfitted with a Retro Graphics, Inc. RG-512 graphics board.

Basically a collection of Fortran-callable routines, the software includes MOVE, DRAW and POINT routines that are available in device and virtual coordinates and in absolute and relative modes, according to a spokesman.

Hard copies of graphics images can be obtained via the software's graphics memory readback routines, the spokesman noted.

The package costs $450 and can be ordered from the company at Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

# Dictionary Gets CICS Update

BEDFORD, Mass. — Synergetics Corp. has enhanced the CICS version of its Data Catalogue 2 data dictionary.

The data dictionary now offers a more tutorial and menu-driven operation. In addition, new formats have been added to allow full-screen display. And the package's QUERY and SHOW commands have been combined to make operation easier, the vendor said.

The CICS support system for Data Catalogue 2 costs $3,000 and is available on IBM's OS, OS/VS, MVS, DOS/VS and DOS/VSE operating systems. The basic dictionary for OS, OS/VS and MVS costs $14,900. The DOS/VS and DOS/VSE version costs $12,900.

The dictionary is also available for Univac's Univac-1100 for $12,900 from the vendor at One DeAngelo Drive, Bedford, Mass. 01730.

# Promac Syntax Likened to Cobol

VALLEY FORGE, Pa. — Promacs, a free-form, high-level programming language similar in syntax to Cobol, is available from Management and Computer Services, Inc.

Promacs can be used to create programs using macros that create a structured Cobol program processed by the Cobol compiler. The language is said to increase programmer productivity in utility programs, maintaining software and creating reports, the vendor said.

Promacs can be used in almost any software environment including IBM's TSO, CMS or DL/1. It costs $12,000 from the vendor at Great Valley Corporate Center, Valley Forge, Pa. 19482.

# Free Buyer-Seminars Slated For September

ANDOVER, Mass. — Software International Corp. (SI) will hold a series of free one-day seminars starting next month in 46 cities across the U.S. and Canada, aimed at prospective buyers of applications software packages.

"How to Achieve Better Financial Results with Software Packages" will begin its run Sept. 9 in Rochester, N.Y., and wrap up on Dec. 4 in Louisville, Ky.

In addition, each company attending the seminars will receive a certificate worth $1,000 toward the lease price of any SI product, a spokesman explained.

Additional information on the seminar and a full schedule can be obtained from SI at 2 Elm Square, Andover, Mass. 01810.


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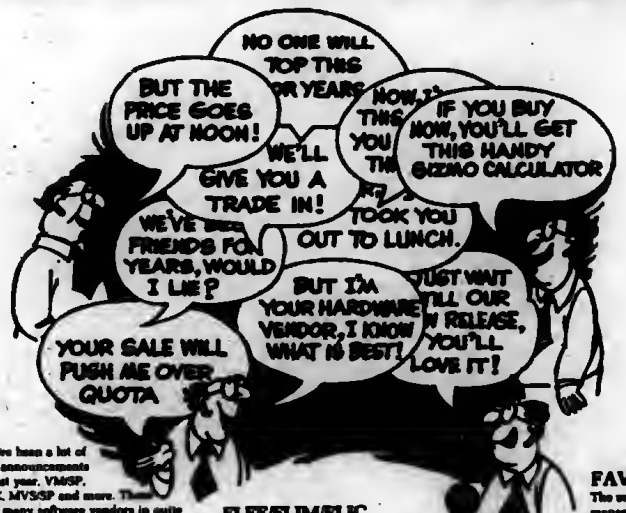
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## Packet Nets Adopt 3270 Interface

VIENNA, Va. — North America's three major public packet-switching carriers have agreed to a common communications protocol for interfacing IBM's 3270 binary synchronous data terminals.

The deal affects the Telenet, Tymnet and Datapac packet networks run by GTE Telenet Communications Corp., Tymshare, Inc. and Bell Canada's Computer Communications Group, respectively, according to a spokeswoman for GTE Telenet here.

The three parties to the agreement will eventually extend the protocol specification to other carriers worldwide, she said. The new protocol is expected to give a CRT terminal or printer direct connection on demand to a host computer independent of other devices attached to its controller, resulting in more efficient utilization of terminals and communications lines.

A typical IBM 3270 installation features one to 32 CRT terminals or printers driven by a terminal cluster controller, the spokeswoman noted. The controller generally has direct connection to a host via a leased communications line.

Users can get more details on the protocol from Sheldon Fox at GTE Telenet, 8330 Old Courthouse Road, Vienna, Va. 22180. Tymshare can be reached at 20665 Valley Green Drive, Cupertino, Calif. 95014. Bell Canada's Computer Communications Group is at 160 Elgin St., Ottawa, Ontario, Canada K1G 3J4.

*Converging With Ethernet*

# IEEE Group Drafting Local Net Standard

By Brad Schultz
CW Staff

SAN DIEGO — Representatives from the three firms that jointly announced Ethernet, the local area data network intended to pass 10M bit/sec through coaxial cable [CW, May 26], met with a subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) here recently to start developing a universal standard for local nets.

That standard, known as the Local Network Data Link Control (LNDLC), and Ethernet may wind up as basically the same thing. In fact, Ethernet's "functionality" is a "subset" of LNDLC, according to Gerald Clancy, chairman of the Data Link and Media Access Control (DLMAC) subcommittee of IEEE's committee for local area network standards.

Clancy, who works for Honeywell, Inc., said that David Potter, Robert Printis and Philip Arst of Digital Equipment Corp., Xerox Corp. and Intel Corp., respectively, agreed to help DLMAC draft its approach to data communications among users located within a few miles of each other.

The pledges of help suggest that DEC, Xerox and Intel wish to avoid a situation where two substantially different designs for local nets are each billed as the only approach worth taking, Clancy remarked.

Although the three Ethernet sponsors have not committed themselves to supporting the final version of LNDLC, DLMAC has adopted "virtually all the functionality of Ethernet," Clancy added.

However, the IEEE subcommittee wants LNDLC to operate over a wide range of transmission speeds, whereas Ethernet is pegged for 10M bit/sec only. And a few other differences remain between the two designs, including LNDLC's provision for what DLMAC calls an "acknowledging class of procedure," which Ethernet was said to lack.

The DLMAC subcommittee expects many local net users to transmit data through existing community antenna television (CATV) facilities within a building or strung through the heart of a city.

The coaxial cabling used in CATV is best known to the gen-

*(Continued on Page 50)*

*Eight Programmable Softkeys*

# HP Portable Printer Terminal Bows

PALO ALTO, Calif. — A portable printer terminal for asynchronous communications as fast as 9,600 bit/sec is available with eight user-programmable softkeys from Hewlett-Packard Co.

The 22 lb HP 2675A can receive and store on tape data retrieved from its host computer system. Without an operator present, the printer terminal can also transmit data to the host or, through an automatic answering capability, print a report. This can be done after hours, a spokesman noted, reducing a user's communications overhead.

The operator may select a print format ranging from 40 to 132 char./line on 8.5-in. wide paper and output as many as 120 char./sec using a 7 by 11 dot matrix.

Able to emphasize characters by framing and underlining, the HP 2675A supports the 128-char. Ascii set as well as sets featured by Swedish/Finnish, Norwegian/Danish, German, UK, Spanish and four French

*(Continued on Page 50)*

## *Can You Advise Data Net Managers?*

The deadline for contributions to *Computerworld*'s Nov. 24 Special Report on approaches to planning and implementing a data network is only about a month off. If you can advise communications managers on this topic, it's time to stop planning and start implementing your contributed article, which should be no more than six double-spaced typewritten pages.

Users, consultants, vendors and the academic community are invited to submit manuscripts that identify the main issues of network planning and implementation; recommend ways to manage these processes; or review products and services that communications managers might consider in setting up a network.

Articles should be addressed to Brad Schultz, November Special Report, *Computerworld*, 375 Cochituate Road, Framingham, Mass. 01701 and received by Sept. 26.

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# IEEE Subcommittee Drafting Local Net Standard

(Continued from Page 49)
eral public as an alternative to broadcasting TV signals through the air, but users of distributed DP networks will hearken to the medium, according to International Data Corp. (IDC), when they realize it can greatly extend the number of data channels able to be run simultaneously through a single transmission line.

A single coaxial cable may allow data traffic at faster than 500M bit/sec, IDC stated in "Communications Networks," a report for subscribers to the Waltham, Mass.-based market research firm's Information Systems Planning Service.

What's more, IBM's Systems Network Architecture (SNA) and the X.25 public packet-switching method will be largely obsolete when network users recognize the advantages of broadband coaxial links, IDC predicted.

SNA and X.25 are what the IDC report calls "pipeline" approaches to distributed DP communications. Pipeline transmission, whether analog or digital, entails modulation of a signal across a single physical pathway that must be established prior to the transmission.

In contrast, coaxial CATV links may serve as a "broadcast" approach to data communications. By adding radio frequency modulation capabilities to a CATV network, the coaxial cabling's transmission frequency spectrum may be divided into channels, similar to broadcast TV channels, and those channels may be run through a single line at the same time.

However, two-way CATV transmission links generally do not have transmitting and receiving stations talking directly to each other, the IDC report noted.

Instead, a signal is routed up the coaxial cable to a "head-end" facility, which then retransmits the signal back down on another frequency or a second cable to all receiving stations tuned to that frequency.

### Frequency Spectrum

Many coaxial CATV links are already offering a transmission frequency spectrum as extensive as 300mHz, IDC pointed out, and some of the latest coaxial facilities are advertised as offering up to 450mHz.

IDC's estimate that data speeds as fast as 500M bit/sec are possible with coaxial technology assumes a 450mHz spectrum link would be used with the same efficiency as a voice grade dial-up telephone line transmitting at 4,800 bit/sec on a 4kHz bandwidth.

SNA and X.25 implementations may prove unwieldly in large distributed DP networks as significant numbers of connected processing stations are added, removed or relocated, the firm indicated.

### Standardization Areas

As to local nets, the IEEE's DLMAC subcommittee anticipates three major areas of standardization, according to Clancy. They are:

- Standardization of a peer data link, independent of both the network's topology and speed. This standard would be incorporated into data terminal equipment (DTE).
- Standardization of an interface between DTE and data communicating equipment (DCE), such as modems. This standard would include specification of a physical coupler interface similar to the current RS-449 and X.21 interfaces.
- Promulgation of multiple standards (essentially one standard for each medium type, such as coaxial, fiber optics and infrared) for access control algorithms, signal encoding techniques and accommodating the disparate properties of media, such as electrical conditions for coaxial cabling.

The LNDLC standard is about 90% completed, Clancy estimated. This month, the DLMAC subcommittee will send its recommendations for a final version to the full local area network standards committee of the IEEE. Clancy can be reached at Honeywell Information Systems in Honeywell Plaza, Minneapolis, Minn. 55408.

# HP Portable Printer Unit Operates at 9,600 Bit/Sec

The HP 2675A

(Continued from Page 49)
keyboards.

The printer terminal comes with built-in cartridge tape drives able to store 320K bytes of data per removable tape in files accessible by file name, absolute file number or relative position.

Search/rewind and read/write rates are 90- and 22 in./sec, respectively. According to the spokesman, an updatable tape format allows the same section of tape to hold an initial recording and its revised version.

An I/O buffer and line mode transmission feature permits local editing of up to 254 characters per line prior to transmission or storage, the spokesman continued.

Featuring an RS-232C interface, the HP 2675A printer terminal costs $5,000. An optional built-in 300 bit/sec modem costs $450.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.


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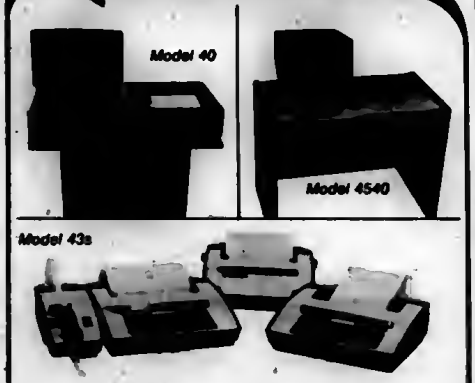


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# Bandwidth Compression May Cut Transmission Costs

HOLMDEL, N.J. — The costs of transmitting video along with data and voice signals over digital copper telephone lines may drop following Bell Laboratories' announcement of a video bandwidth compression technique.

TV signals are usually transmitted in analog form, requiring a medium having a bandwidth of about 6MHz, a Bell Labs scientist explained. Coaxial cabling or microwave broadcast facilities normally carry analog video because standard phone lines cannot handle a 6MHz spectrum, he said.

Digitized video, on the other hand, typically demands 64 million and 100 million bit/sec transmission speeds for monochrome and color representations, respectively. But the AT&T research center's new compression technique reportedly can pass digital TV as a 1.5 million bit/sec stream over wire pairs of Bell's T1 phone line.

The technique involves estimating the motion of objects in a scene and then comparing successive frames spatially displaced by that amount of movement, the spokesman noted. With more than 70 million carrier-miles of T1 lines installed nationwide since 1962, Bell hopes to make teleconferencing less expensive over those lines when the so-called "motion compensation" video is ready for marketing.

# *MPU-Controlled CRT Terminals Feature Detached Keyboard*

TUCSON, Ariz — A series of microprocessor-controlled CRT terminals featuring a detached keyboard for operator comfort has been introduced by TEC, Inc.

The TEC Series 610 Data-Screen terminals offer OEMs and end users conversational and buffered data communications capabilities at 100 through 9,600 bit/sec to permit simple expansion from a teletypewriter mode to a batch processing operation, the firm said.

The detached keyboard has a standard typewriter keyboard layout with a standard integral numeric pad. Standard features include upper case and lowercase characters, protected data fields, forward and backward tab, five different video attributes, X-Y cursor positioning, cursor sensing, page more or roll up mode and self-test. Various nonglare screens are available, as well as other options.

The 610 is compact, measuring 16 in. wide by 13.5 in. high by 15.5 in. deep. Because the terminal has selectable interface features, it can be configured with most of the popular models of computers, the firm claimed.

The 610 Data-Screen terminal costs $1,090 from TEC, Inc., 2727 North Fairview Ave., Tucson, Ariz. 85705.

# System Monitors Remote Stations

FALLS CHURCH, Va. — The Pulsecom Division of Harvey Hubbell, Inc. has introduced a microprocessor-based control system that monitors and supervises activities of the firm's Datalok 10, 10A and 10D dial-up remote CRT stations.

The Datalok 10 CRT Master remote control/supervisory system monitors the communications functions of remote stations and displays alarm information on the CRT screen or printer. Data is categorized by alarm source, type of alarm, security level and time and data of occurence. An audible alarm alerts the operator of alarm occurrences and changes in previous alarms, a spokesman noted.

In addition, the CRT Master operator can interrogate individual remote stations and analog inputs, lock individual alarms or entire stations, request system status reports and activate controls at a remote station. Prices for the CRT Master, keyboard and printer start at about $15,500 — the final cost based on the user's configuration, the spokesman said from the firm at 5714 Columbia Park, Falls Church, Va. 22041.

## Correction

Spectron, a vendor of network test devices and other data communications products, was incorrectly identified as a division of Northern Telecom Systems Corp. (NTSC) in a recent chart [CW, Aug. 11]. Spectron is in fact a division of Northern Telecom, Inc., which together with NTSC is administered by Northern Telecom Industries, Inc., a subsidiary of Northern Telecom Ltd.


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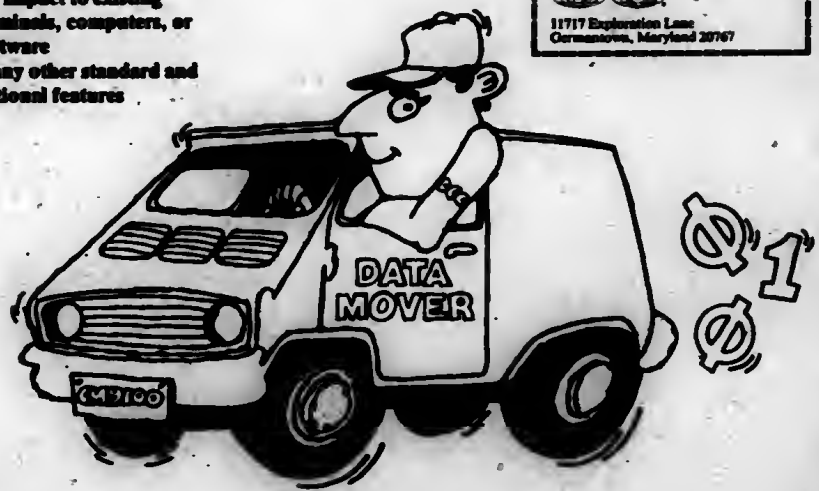

# Now you can watch your four favorite programs...

The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames. Right before your eyes.

That's not all. The HP 2626 has two data communications ports instead of the usual one, so you can use the split screen capability to talk to two computers at the same time. Or log onto the same computer twice for simultaneous batch and interactive jobs.

## More than meets the eye.

A high resolution character cell and a glare-reducing screen coating give the HP 2626 the sharpest, clearest display of any of our terminals. And that's saying a lot.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode to print up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

An interactive forms drawing module makes it easy to design forms, including drawing horizontal or vertical lines with just a single keystroke. You can even program the terminal for audio tones to cue your operator to critical or non-critical errors, or other conditions within a program.

## Split decisions.

Hook up the HP 2626 to two computers (or the same one twice) and it's like getting a multi-tasking capability right in the terminal. Your systems designer can now compile, execute, monitor and edit programs as if two stations were available.

While your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmis-

# ...same time,

sion lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

If you'd like to watch a program on the new HP 2626 display station, or any of our terminals, just call your local HP sales office listed in the White Pages. You can also write for more information to Hewlett-Packard, Attn: Ed Hayes, Dept. 371, 19400 Homestead Road, Cupertino CA 94015. Or just return the coupon.

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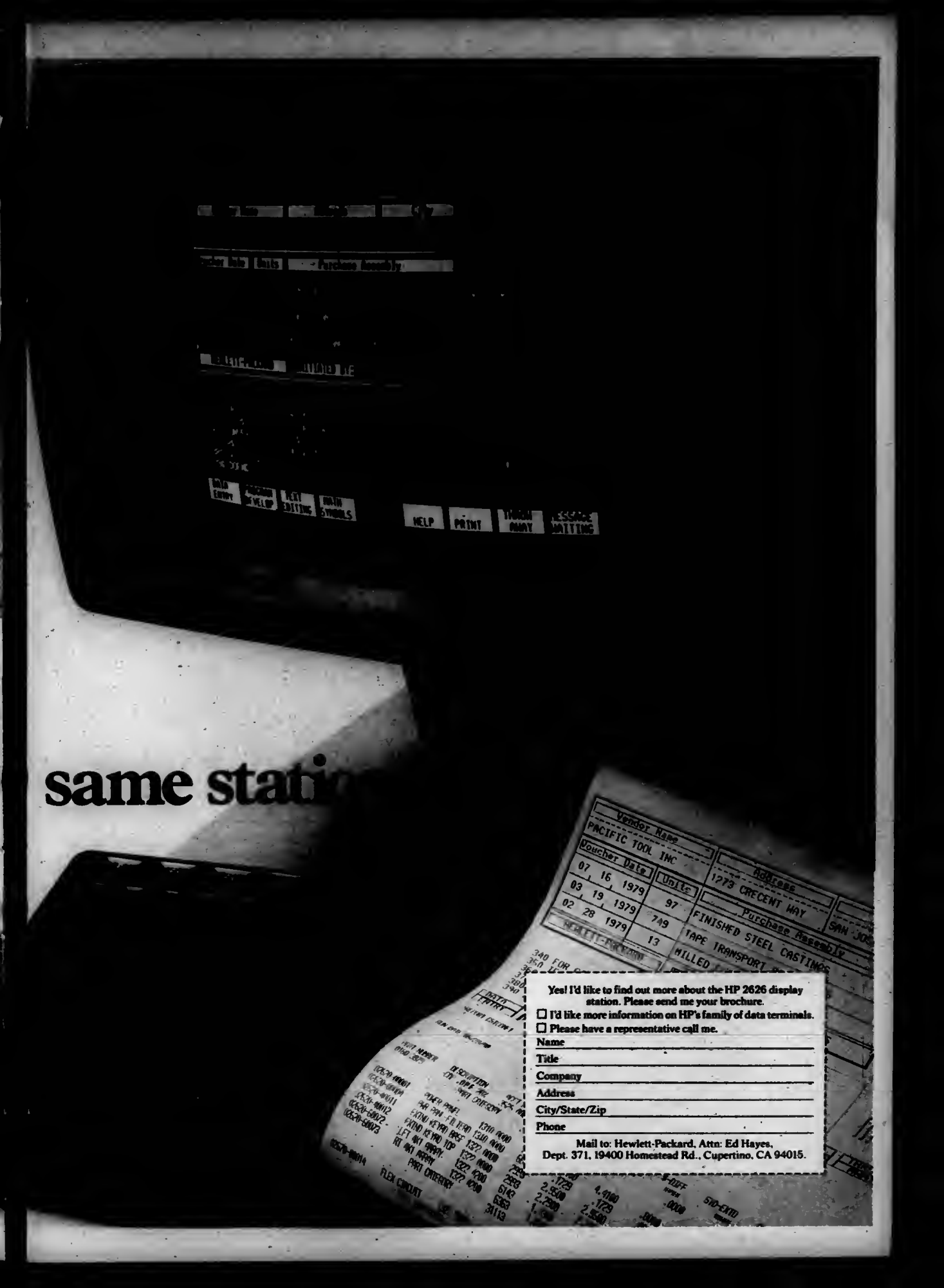
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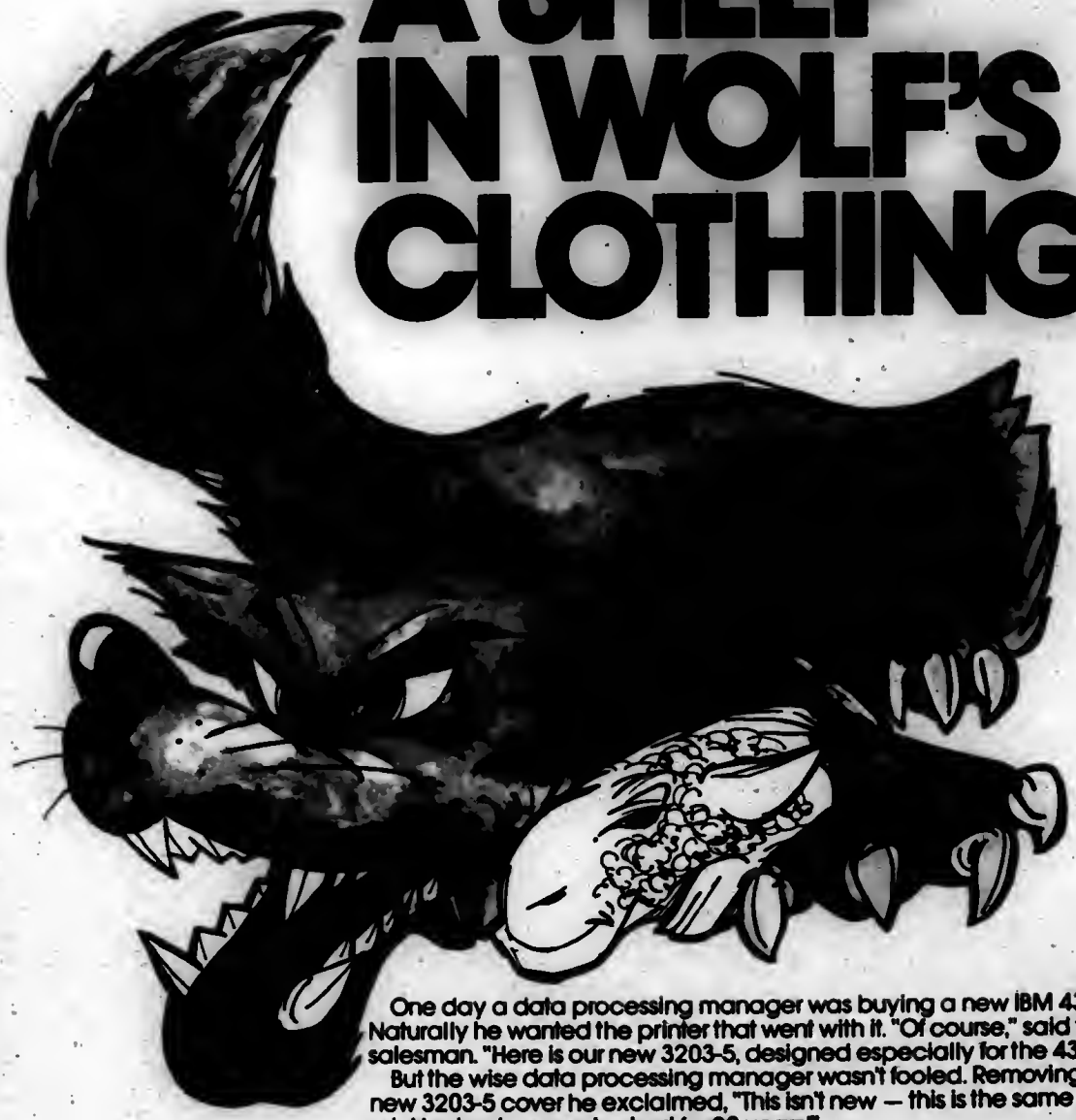
A GRIM FAIRY TALE FOR 4300 USERS

# A SHEEP IN WOLF'S CLOTHING?



One day a data processing manager was buying a new IBM 4300 system. Naturally he wanted the printer that went with it. "Of course," said the salesman. "Here is our new 3203-5, designed especially for the 4300."

But the wise data processing manager wasn't fooled. Removing the shiny new 3203-5 cover he exclaimed, "This isn't new — this is the same print technology you've had for 20 years!"

And so the data processing manager bought a Documation IMPACT 4303/15 printer instead. Thanks to its brand new design, the IMPACT 4303/15 is faster than IBM's 3203-5 and is more cost effective.

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The moral of our story ... beware of a sheep in wolf's clothing. If someone tells you IBM's 3203-5 is really new, they may be just trying to pull the wool over your eyes.

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## *MVS Study Details Features*

# What Does Data Streaming Mean to You?

By Rita Shaw
CW Staff

MARINA DEL RAY, Calif. — What is the Data Streaming Feature introduced by IBM with its recently announced 3380 disk drive (CW, June 16) and what does it mean to your particular installation?

Not much ... unless your mainframe is in IBM's 30 series, according to a study entitled "The MVS/System Product Report" from Candle Corp. here.

Data Streaming was among the features analyzed in this document that covered the MVS operating system enhancements as well as the DASD products that were introduced in June.

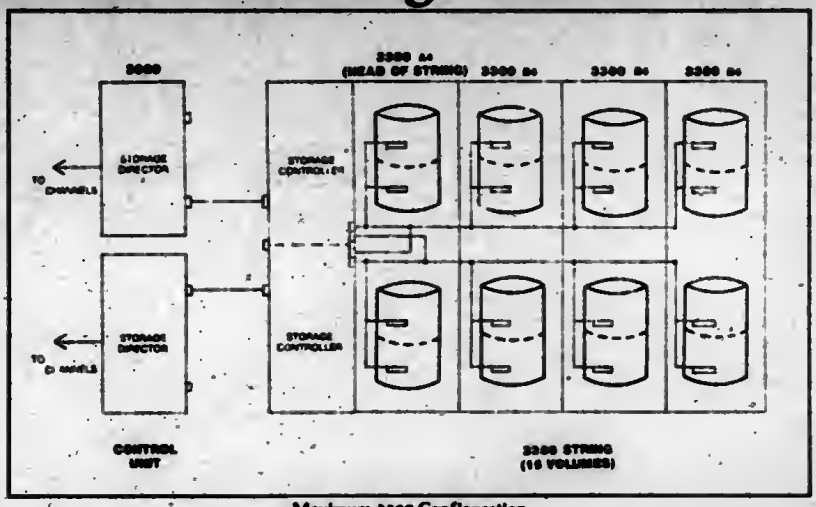
### Buffer Option

The 3M-byte data transfer rate supported by the 3380 disk in combination with the Data Streaming Feature is not available on the channels used with 370/158 and 168 hardware. Users with these processors can attach the 3380s to their older, slower channels via a Speed Matching Buffer Option, according to the report.

However, the name of this product describes its function very aptly — it is a high-speed buffer built into the 3380 control unit that can accept data from the fast disks at 3M bytes/sec and transfer it through the 158 or 168 channels at their maximum data transfer rate of 1.5M byte/sec.

"Of course," the report continued, "this reduces the effective transfer rate [of the 3380]."

Under current I/O architecture, a channel and a control unit "shake hands" between each byte of data transferred, according to the Candle analysis. This "obviously" slows down the data transfer rate, but the Data Streaming Feature that will be available for IBM 30 series channels will cause this handshaking to be done between each block — rather than each byte — of data.




Maximum 3380 Configuration

### Cable Increase

Thus, the total data transfer rate is more than doubled from the specified rate of approximately 1.2M bytes/sec of IBM's 3350 drives, according to the report. Data Streaming also is said to have the effect of increasing the maximum possible cable length from channel to control unit from its current limit of 200 feet to 400 feet.

The Data Streaming Feature may be applied to the first two block multiplexer channels of a channel group. In other words, Data Streaming will affect only two of the six channels controlled by a particular channel di-

(Continued on Page 56)

## *Offers Continuous Scanning*

# OCR System Reads 3,000 Page/Hour

NORRISTOWN, Pa. — A high-speed OCR system featuring reading rates of up to 750 document/min and page reading rates of up to 3,000 per hour has been introduced by Scan-Data Corp.

The system also features continuous scanning with large area scan window and document loading and unloading on the fly, the firm stated. The 2280/1 OCR system also features serial numbering and in-line or simultaneous multiple reject correction stations with Scan-Plex I at full res-

(Continued on Page 56)

The Scandata 2280/1 OCR System

A Way to Keep Computers on the Right Track

John Beall & Company, Inc.

# Bits & Pieces

## OMR Scanner Integrated With TI 990 Mini System

MINNEAPOLIS — National Computer Systems, Inc. has introduced an optical mark reading (OMR) scanner and document processing system.

The Sentry 80 features an OMR scanner integrated with a Texas Instruments, Inc. 990/10 or 990/12 minicomputer system, the vendor said.

Two models of the system have been announced. The Sentry 8008 scans 8/5-in. by 11-in. documents at 3,000 sheet/hour and the Sentry 8018 scans 6,000 documents/hour, the vendor said.

The system costs between $90,000 and $200,000 from National Computer Systems at 4401 W. 76 St., Minneapolis, Minn. 55435.

## Wabash Hikes Prices On All Media Products

DES PLAINES, Ill. — Wabash Tape Corp. has announced price hikes on all of its media products.

Effective immediately, prices on all IBM-compatible and Shugart Associates, Inc.-compatible diskettes will be increased an average of 6%, while the cost of the firm's Quadronix computer tape will rise by an average of 8%. The company's main tape product, G-Tape, will increase 10% in price, a spokesman said.

The price increases were necessary because of the higher cost of raw materials, he noted from 2700 Des Plaines Ave., Des Plaines, Ill. 60018.

## ROM Capacity Boosts 101XL Data Entry Unit

CEDAR RAPIDS, Iowa — Norand Corp. has expanded the read-only memory (ROM) capacity of its 101XL portable data entry terminal from 12K to 16K bits.

The increase is said to allow the terminal to perform more complex data recording, item counting, total generation and mathematical tasks, the vendor said.

The memory enhancement costs $170 from the vendor at 550 Second St. S.E., Cedar Rapids, Iowa 52401.

# Data Streaming: What Is It?

*(Continued from Page 55)*

rector with the other four channel operating in their normal mode, according to the report.

The Data Streaming Feature is supported on models 2 and 3 of IBM's 3880 storage control unit, which were announced at the same time. In addition, the vendor announced an eight-channel switch option that allows the user to attach as many as eight channels to each storage director for a total of 16 (see related diagram).

Ordinarily, as the Candle report noted, the same eight channels must be connected to each storage director, allowing two physical paths to each volume controlled by the 3880 from each of the eight attached systems.

Priced at $10, the 40-page report is available from Candle Corp., Suite 401, 4676 Admiralty Way, Marina del Ray, Calif. 90291.

# Scandata Offers OCR System

*(Continued from Page 55)*

olution.

Characters that fail to be recognized are handled with scanning on multiple stations for maximum throughput, the firm claimed. Rejected character images for correction are separated from good data to ensure maximum throughput of perfect documents. The 2280/1 handles forms as small as 2.2 in. by 3 in. and as large as 12 in. by 14 in.

With a cold light source, minimum moving parts and a single drive and motor, the 2280/1 uses less power and generates fewer British thermal units than any other page and document reader in its price range, the firm said.

Depending on choice of magnetic tape and character font, the typical system starts at approximately $300,000 and is available on a rental basis starting at approximately $6,500 from Scan-Data, 800 E. Main St., Norristown, Pa. 19401.


COMPUTERWORLD can't cover all of Info 80 in **one** issue. That's why we're covering it in **two!**

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October 13th — Info 80 Wrap-up Issue

Computerworld will bring you two-part, total coverage of the most important information equipment show in the East. Info 80 will be held again this year at the New York Coliseum, October 6th-9th. A heavy turnout is assured with a record audience of between 22,000 and 25,000 corporate executives, DP managers and administrative managers—Plus, there'll be more than 200 exhibitors, 250 speakers and 80 sessions.

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We also have a booth there, so if you're going, stop by #2523 for a free copy of our Show issue. It'll outline the high points of the show—exhibitors, speakers, special events—along with a guide to night life in New York. Ad closing dates for these two special issues are shown below.

If you're aware of the revolutionary changes taking place in the use of information systems and the impact they can have on your business—you can't afford to miss this two-part total coverage. And if you're exhibiting, be sure to put your ad in both of these issues. Your Computerworld representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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Aug. 25, 1980

SPECIAL
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REPORT

# Choosing the Right Mini Road

COMPUTERWORLD

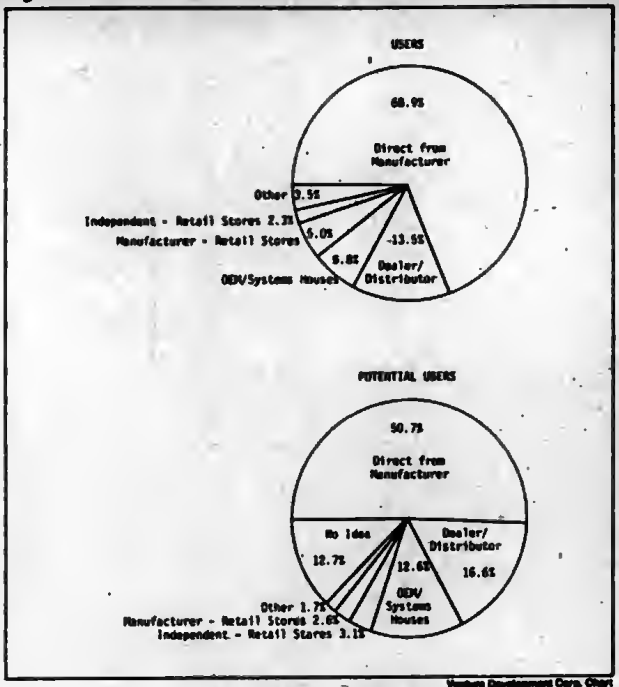
# Users Prefer to Deal With Manufacturers

Small business systems are used for a variety of applications, but where do users get the computers for their small business needs?

Presently, more than two-thirds of small business system users obtain their systems directly from the manufacturer, and more than half of potential users will probably follow this route, according to Venture Development Corp. (VDC).

Basically, small systems vendors use four major distribution channels: direct sales, systems houses, dealers/distributors and retail stores (seel figure). Setting up a direct sales-force is costly, and many new vendors choose instead to sell through dealers or distributors, or to systems houses. Some of the larger manufacturers, notably Digital Equipment Corp. have set up retail stores to market systems directly to end users. Independently owned retail stores are also beginning to sell small business systems in addition to personal computers.

Although buying directly from the manufacturer is the preferred method, 6.8% of present users bought their equipment from systems houses and 12.6% of future users indicated they would. Further, 13.5% of present and 16.6% of future users confessed that dealer/distributorships are the only way to go, and 7.3% of present and 5.7% of future users turned to retail stores.




**Method of System Acquisition**

Many present and potential users prefer systems houses and dealers/distributors because a total solution is offered, including industry-specific applications packages and reliable maintenance and service. Because these sources are usually local, they can work closely with the user.

Present and potential users frequently cite one of four specific reasons for not preferring to buy a small system from a retail outlet:

- Lack of industry-specific applications.
- Inadequate software support.
- Need to go to an outside source for maintenance and service.
- The absence of single-source responsibility for their system.

This reluctance indicates that the much-heralded trend toward the establishment of both manufacturer-owned and independent retail stores will *not* accelerate sales of small systems to small businesses. Retail stores will be efficient channels for selling to computer professionals and large companies with computer expertise, the so-called "easy sales," but small businesspeople require more education and post-sales support than the average retail store can provide.

## *Three-Year Search*

# Faced With Rising Overhead, User Picks Mini

Special to CW

SAN MATEO, Calif. — James R. Spencer, president of Western Building Maintenance, Inc., spent three years searching for just the right minicomputer to handle his business problems and collected an assortment of horror stories along the way.

For instance, Spencer heard tales of users being caught between the computer hardware supplier and the software supplier in the fight about who was to blame when troubles developed. His experiences convinced him that any system he selected should be handled exclusively by one company that would provide hardware, software and support — and time to make his selection was running out.

"I was faced with a decision," Spencer explained. "The paperwork associated with our general accounting was causing me to consider adding another clerk to my accounting staff and that meant another $1,800 a month or so in overhead expenses." Not only that, but storage space for the firm's growing reams of paper was fast becoming a problem.

### F-85 Mini

Spencer finally selected a Durango Systems, Inc. F-85 minicomputer, a system that offered features to fill all of Western's needs.

Western had actually begun its office automation in a small way several years ago when it obtained a bank payroll service to handle employee wages and withholding. After the bank payroll service was no longer adequate, it moved to a time-share service that included an on-line terminal. "It was nice having the terminal in the office, so that data could easily be entered and changes made without a fuss," Spencer said.

Unfortunately, the time-shared system did not provide job cost or accrual capabilities and required Western to record the day's activities on computer paper, and that in turn had to be stored. As the business grew so did the volume of paper, requiring more and more storage space.

The lack of data-handling capability combined with the prospect of having to increase Western's storage space and accounting staff was overwhelming justification for seeking a business computer capable of meeting present and future needs while maintaining cost-effectiveness, Spencer said. Having spent three years gathering and studying data about business computers, he felt he was in a good position to make the best selection.

### Software Needs

Spencer, aware that software to satisfy a maintenance company's specific needs does not just happen, said "I heard a lot of proposals by computer salesmen. They tried to convince me their standard business software would do the entire job, but I knew better.

"I had learned to ask very specific questions about information I wanted from the computer.

"I wanted to be able to track all direct costs associated with each job; automatically accrue vacation and sick leave for each employee; accrue workers' compensation cost; prepare a self-audit report monthly; and define and maintain a union report capable of

*(Continued on SR/4)*

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## *Seventy Percent are 'First-Timers'*

# Small Users Value Maintenance, Ease of Use

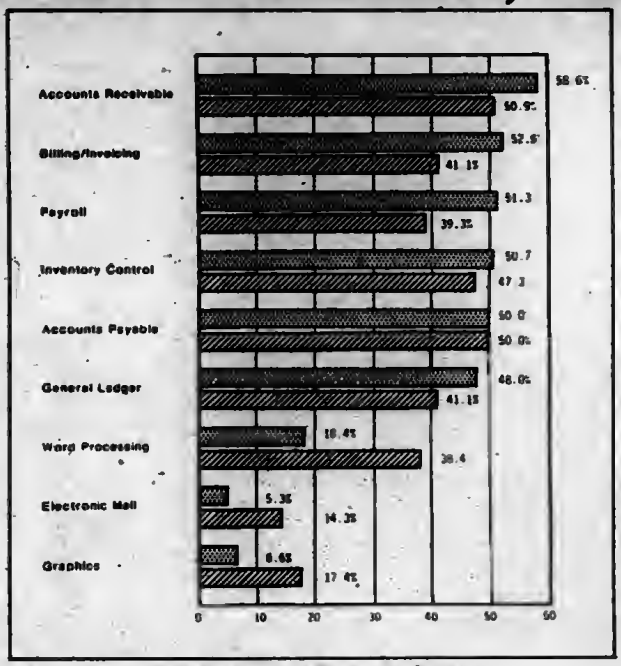
By Karen E. Rosenfeld
Special to CW

WELLESLEY, Mass. — Despite their name, small business computers are not used exclusively by small businesses.

Small systems are also used by Fortune 500 companies in individual departments such as accounting and payroll and as part of companywide distributed data processing networks. Large companies utilize small systems as a cost-effective method of handling specific business-oriented applications, while small companies, two-thirds of which have annual sales of $10 million or less, use them to automate their most time-consuming and paper-generating activities.

Three-quarters of all small business systems are used in four major industry sectors: services (25.3%), manufacturing (20.6%), wholesale/distribution (18.2%) and retailing (10.3%). Therefore, a key problem facing vendors of such systems is how to meet the needs of users who differ in terms of company size and industry type. How can vendors offer applications and services suited to user needs and develop effective channels of distribution to get the complete package to the user?

A recent survey by Venture Development Corp. (VDC) here takes an in-depth look at all these areas in order to provide industry participants with data on which to base future product and marketing strategies.




**Small Business Computer Applications**

### What Users Seek

VDC surveyed present users and potential users to determine exactly what they want in a small system. Maintenance, service and ease of use are top on the list of selection criteria for both users and potential users. Applications availability is second in importance among potential users, while reliability ranks second for present users. Price is the next most important criterion for both present and potential users.

Other key selection criteria are flexibility, ease of programming and expansion capabilities. Criteria less crucial include vendor image and training.

Since more than 70% of small system users are first-time buyers with no computer experience, it is understandable that maintenance, service and ease of use are thought vitally important. Users need systems that can be operated by staffers without extensive training, since few small businesses can afford to hire experts to run their equipment.

First-time users also require hand-holding through all phases of installation until the system is up and running, and they need the assurance that, if something goes wrong, downtime will be kept to a minimum by fast and efficient service and maintenance. A small company's budget can't tolerate costly downtime and excessive installation delays.

Potential small system users are also concerned about applications availability. Small business owners and mangers want to make sure that systems will work in their own "unique" situation. First-time users typically consider their particular processing needs as truly special, and vendors should be careful to reassure the customer by getting to know his business inside and out before proposing a system and applications software.

### Horror Stories

In talking with potential users, VDC found that many were wary because they had heard horror stories about businesses similar to theirs which ran into debilitating problems while installing a system. One potential user in the Midwest cited a story he had heard about a businessman who waited more than a year for his system to be fully operational. During this time, the frantic businessman had to employ two software specialists in order to make his applications programs work.

Small businesses in particular have neither the time nor the money for that type of setback; and the spread of such stories, however apocryphal, underlines the genuine fear some potential users have. Small users want applications suited to their needs, and once they've decided on a system, they want it up and running with no delay or additional expense.

In a small business, accounting functions are generally the first to be computerized, since the simple repetitive operations lend themselves easily to computerization via canned programs. VDC's research shows that the standard accounting tasks of accounts receivable, billing/invoicing, payroll, inventory control, accounts payable and general ledger are the applications for which both current and potential small system owners would most often use computers.

Other applications mentioned by more than 20% of present and potential users include sales analysis, order entry, financial management, report generation, transaction processing and mailing lists.

The accompanying figure also shows three related applications which VDC believes will experience rapid growth over the next five years — word processing, electronic mail and graphics. The first two are tied in with the growing trend toward the automated office of "office of the future." The third, graphics, will be used primarily on higher priced small systems.

### Word Processing

Word processing is presently done by only 18.4% of small system users. However, nearly 40% of potential users expressed interest in having word processing capability as part of their system. This makes sense for a small business which probably won't run its system full-time for data processing. With word processing capability, the system can serve double duty to automate office functions such as letter and report writing/editing.

Since electronics mail applications require a system with communications capability, and since fewer than 30% of present owners use this capability, it is not surprising that only 5.3% of small system users make use of electronic mail. However, 14.3% of potential users expressed interest in electronic mail, particularly in departments or divisions of larger companies. One factor spurring usage of electronic mail is the continuing rise in postage rates.

Larger companies will also account for most of the growth in graphics applications, since a more expensive system with larger memory and communications capability is required. Among present users, 6.6% use graphics, while 17.4% of potential users are interested in this application.

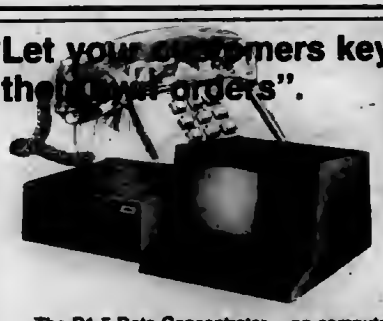
### Users Don't Want Waves

Small businesspeople are particularly interested in small systems that meet all their processing needs with a minimum of disruption to current operations. They overwhelmingly prefer industry-specific applications packages tailored to their business, rather than general applications packages which might require a change in company procedures to suit the applications packages which might require a change in company procedures to suit the program.

To be successful, vendors will need to develop applications packages for specific businesses. The large number of retailers, medical and law practices, insurance agencies and wholesalers/-distributors suggest the enormous potential of an "industry-specific" marketing strategy. A general accounting package, for example, could be used in a medical practice, but an accounting package designed to incorporate third-party billing and other requirements unique to the medical business is far more desirable because it requires no additions or modifications.

One marketing specialist from a major small system manufacturer put his finger right on the problem. "Vendors just don't understand the importance of having people familiar with the industry writing applications packages,"

*(Continued on SR/4)*

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# First-Time Users Who 'Go It Alone'

By Steven D. Bell
Special to CW

As technology advances and equipment prices fall, the minicomputer is finding its way into many small businesses. Small manufacturers, retailers and professionals can now take advantage of this "electronic marvel" in their daily operations.

However, for the first-time user, the process of selecting, acquiring and installing a small business system can be a confusing and frustrating task.

Contrary to popular belief, the small computer user needs at least as much professional guidance and expertise as the large mainframe user. Large amounts of time and effort are required to determine informational needs, document existing systems, select minicomputer hardware and evaluate software packages. And while a few inexperienced users have successfully overcome these difficulties on their own, many more have met with disaster. The less a first-time user knows, the greater the risk of failure.

The problems associated with defining needs and setting goals are especially acute in small businesses where operating procedures often evolve without any real planning or documentation. In such an environment, the true nature of operational problems are not always recognized. The decision to acquire a small business system may represent the "solution" to a perceived problem, but may not address its true cause.

Thus, installing a minicomputer may actually worsen the situation. Perhaps a company's informational needs can be satisfied by streamlining existing manual procedures or by employing a service bureau.

It is important that the would-be minicomputer user adequately define his needs and objectives before proceeding, enlisting the aid of a competent professional if necessary. The time and money invested at this point will be returned many times over the course of the installation.

### Entering Marketplace

Let's assume that an informed decision has been made to acquire an in-house minicomputer system. Now the inexperienced user must enter the complex world of the small computer marketplace. Unfamiliar concepts and vocabulary make the difficult process of hardware selection and software evaluation much harder for the first-time user. Unfortunately, this lack of understanding is often exploited by vendors in the rush to close a sale.

Minicomputer hardware vendors tend to emphasize reliability, capacity and ease of operation when dealing with the first-time user. And, indeed, these are important considerations when selecting a small computer or any other piece of equipment. But it is important to keep them in perspective.

Today, almost all minicomputers are well-built and reliable. But, as with any other piece of equipment, they will occasionally break down. When this occurs, the most urgent consideration will be getting the system operational in the shortest time possible. Thus, the first-time user's prime reliability concerns should focus not on the equipment itself, but rather on the vendor's service record. A service contract detailing repair capabilities and response times is a must, as is an agreement for continuing preventive maintenance.

# User Battles Overhead

*(Continued from SR/2)*

handling variables associated with the nine unions and/or locals with which we deal.

"None of the computer companies had software capable of doing that job, including Durango."

Durango, however, was willing to develop Western's special software at considerable expense of its own because it felt other companies would require the same capability. "They impressed me with their willingness to work closely with my company in defraying part of the system's cost," Spencer said.

Although the software was developed for the typical janitorial service company, it can be used by other companies interested in monitoring the direct costs associated with individual jobs.

"The system has helped with a number of tasks not easily assigned to a clerk," Spencer stated. "For instance, we now get a profitability report from the computer for each individual job, combination of jobs by client or all jobs by geographic area — something that would be cost-prohibitive to prepare manually."

The job-cost system provides for up to 99 cost codes and 999 process codes. Each line item prints units, dollars and the percent of total cost.

Job-cost analysis reports supply management with annual or term contract totals (revised price), billing, payments, total cost, profit and loss and all year-to-date with percentage of billings. This system also provides job-estimate and comparative capabilities.

### System Installation

Western's F-85 computer system incorporates a central processor with 64K bytes of memory, a keyboard, a 165-char./sec bidirectional printer, a CRT terminal, and two minidiskette storage modules in a single 65-lb desktop unit just a little larger than an electric typewriter. The system also includes an optional 24M-byte fixed disk.

After the purchase had been made, the next steps were the installation of the computer systems and training of Western's office personnel. Training time turned out to be minimal, but Spencer was quick to add, "That doesn't mean you can expect to convert from your manual bookkeeping system to a specialized automated system overnight — it just won't happen. Minor problems are inevitable in a changeover."

Starting with the standard software packages (accounts receivable, general ledger, accounts payable, invoicing/inventory and payroll), Western was on-line in just 10 days with Durango's help. "We took delivery of the F-85 system Nov. 16, 1979, the fixed disk on Dec. 14, 1979 and we were running parallel with our time-share system Jan. 8, 1980," Western's president pointed out.

# Small Users Value Upkeep

*(Continued from SR/3)*

he said. "Programming background isn't enough! Accountant should be writing packages for CPA firms! Lawyers should be writing legal packages!"

It's not enough, though, for the vendor to identify user needs and develop applications to fill these needs. He must then set up efficient channels of distribution to reach the businessman. Industry leaders already have existing channels as well as the financial resources to develop new ones.

*Rosenfeld is a member of the research staff in the Computer Consulting Division of Venture Development Corp., a Wellesley, Mass. company that specializes in strategic planning and marketing research to electronics companies.*


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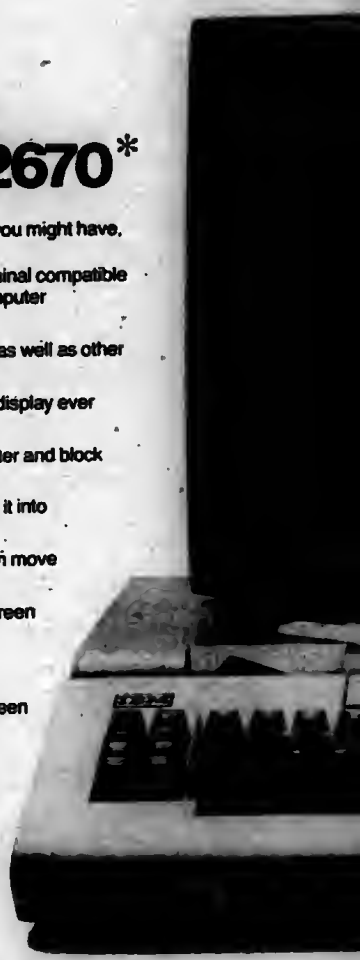

*In New York call 800-942-1918.

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# Might Meet With Disastrous Results

Hardware capacity specifications can be extremely confusing to the first-time user. Statistics about instruction cycle time, read-only memory (ROM) and random-access memory (RAM) sizes, disk access time and so on have no meaning to the small businessperson who wants to know whether the system will work for him.

A hardware vendor's sales representative often does not have the skill necessary to answer this question. A lack of knowledge about the user's business operations and his expected software applications also reduces the vendor's usefulness in determining appropriate hardware capacity.

Without expert guidance the inexperienced small system user may find he has acquired a Porsche, when he really needed a pickup truck.

Modern minicomputers are much easier to operate than their predecessors. In fact, most office workers familiar with typewriters and adding machines can learn to operate the equipment in a short period of time.

However, it is much more important that a minicomputer be operated correctly as compared with a typewriter. Do not be misled by advertisements showing children happily programming their homework assignments on their own minicomputer. Incorrect operating procedures can quicly become costly problems. Operator training should be included in the purchase contract.

Probably the single most important consideration after the decision to acquire a minicomputer is application software. Without suitable software, even the best computer is just so much dead metal. Unfortunately, most first-time users are not aware of this fact, and may wind up with a system that doesn't perform as intended. Computer professionals have heard the story time and again of the small businessperson who buys a minicomputer only to find it doesn't work because there is no software for it.

*Bell is a consultant with Integrated Management Systems of Redlands, Calif. specializing in small business systems and software.*


# ASCII two step

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| | IBM 3101 Display – Block Models | |
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Special CW

DENVER — By automating clerical functions, Harper Reed Corp., a general insurance agency here, has increased cash flow, improved service to its agents and reduced overhead costs.

Its Digital Equipment Corp. Datasystem 310 maintains in-force-policy files, agents' listings, accounts payable, expirations, aged accounts receivable and mailing lists. The system saves $6,180 annually over the cost of the computer service bureau used previously.

Harper Reed was formed in January 1978 to serve as a general agency specializing in home and recreational-vehicle insurance. A general agent functions as an intermediary between independent agents and several insurance companies. They underwrite policies, bill agents and forward payments to the insurance carriers.

The company writes in excess of $1 million in premiums annually through 4,100 agents in 11 western states.

Time and money were the basic reasons for changing from the service bureau to an in-house business system. "Previously, we closed our books approximately 10 days before the end of the month," Brian Smith, Harper Reed's founder, said. "We then sent the material to the service bureau in Tulsa, Okla., since there was no local bureau with a general agency program.

"The bureau returned it on about the 10th of the month. It then took about five days to collate the statements for mailing to the agents. On the average, there was a lapse of two weeks in every monthly period."

The time delay caused a number of problems. The agents received statements in the latter part of the month which did not reflect payments made between the 20th and the first. In some instances, the agents were billed for policies they had not yet received. Occasionally the insurance carriers would bill Harper Reed for policies that were not yet in effect.

"When I received a bill for more than $1,000 from the service bureau, I knew something had to be done," Smith stated. "I started calling insurance agents in town to find out who was knowledgeable in insurance programs and computers."

Smith was referred to the Professional Automation Group, Inc. in Denver, Colo., an independent supplier of DEC Dstasystems that specializes in the insurance industry. The company provides turnkey management systems for independent insurance agents.

After examining the requirements, Professional Automation recommended a DEC Dstasystem 310 with 32K characters of main memory. The compact desk-sized computer has four RX01 floppy disks giving a total storage capacity of more than 1M characters, a VT52 CRT terminal for data entry and a 180-char./sec printer.

"We looked at systems from several other manufacturers," Smith noted, "but DEC seemed to have all the advantages. It is a large well-known company, service is available locally and the system was immediately available."

### Smooth Start-Up

Professional Automation wrote the general agency software especially for Harper Reed and is marketing the programs to other firms. "They entered all our data into the floppy disks during March 1978 and then ran the programs as a test. In April the complete system was delivered. In effect, they simply rolled the machine in the room, plugged it into the wall and we were in business," Smith recalled.

Louise Collins inserts phonograph-record-sized floppy disk into Datasystem 310. Disks contain general agency programs as well as complete data on in-force policies, independent agents in the 11 Western states served by Harper Reed Corp. and mail lists.

All of Harper Reed's staff are underwriters with no previous computer experience, so Professional Automation conducted a three-day training course.

Harper Reed has a complete listing of about 8,000 in-force policies stored on two floppy disks. Each listing contains name of insured, policy number, agent's number, effective policy date, policy expiration data, amount of premium and transaction code (new business, renewal, endorsement, cancellation). The policies themselves are stored in conventional file cabinets.

All important data can be viewed on the Datasystem 310's CRT terminal or output on the printer. The Datasystem 310 sorts the policy lists and deletes cancelled and expired policies from the file as well, adding new and renewal policies to the in-force file. It also selects and prints expirations for the agents or for Harper Reed and prints the in-force file once a month.

On command, the system automatically compiles and prints agent statements, aged acounts receivable, cash disbursements, company accounts current and trial balances.

The general agency software also includes statistical programs with prepared monthly production reports by agent, state and product.

### Agents' Statements

"We are able to work right up to the month's end. Then the computer automatically prepares comprehensive country-club statements detailing every transaction for our agents," Smith said. The statement indicates the policy number, name of insured, transaction and class code (whether it be homeowner's, mobile home, motor home, travel trailer, motorcycle, snowmobile or aircraft). It also shows the gross amount of the premium, the percent of the commission, the commission amount and the net payable.

*(Continued on SR/8)*


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## *Wise Shopper Will Stick to Basics*

# Buying First System: A Suggested Strategy

By Peter Beni
Special to CW

WESTBORO, Mass. — Advances in computer technology plus declining prices give the small business system buyer some real opportunities to win big and make a smart purchase.

To buy wisely, you should do three things: First, start with a positive attitude and don't take no for an answer the first time somebody tells you you can't do what you want to do. Second, take time to educate yourself about small computers and how they might fit into your business. Third, when you see what looks like the smartest buy for you, weigh the risks against the benefits one more time before you take the plunge.

For a few hundred dollars, you can buy a home computer that can do complex calculations, play games and teach you a great deal about computers. But to computerize your business, you need a business computer.

Home computers have a number of serious drawbacks for serious business use. For one thing, they have limited expansion capacity. Few software packages for home computers can handle the volume of data required for serious business applications (inventory control for a distribution business would be a good example.). And the manufacturers of home computers may not be able to provide the level of support business users require.

Computerizing a small business is a major step, and you need to protect yourself. You want to know that the company that builds the computer is going to be around for the long haul. You should feel secure about the availability of continued support, parts, trade-in, compatible add-on equipment and upgrading capability.

For most small businesses, the greatest potential benefit from the use of computers lies in the basic business applications — order entry, accounts receivable, accounts payable and general ledger. It is in these areas that you have the greatest likelihood of success.

Both computer users and suppliers have devoted a vast amount of energy to develop effective methods of handling these tasks. As a result, there are more proven, reliable software packages available in these areas than in any others. These are also the areas in which you have already developed manual systems. What you have learned using those manual systems will stand you in good stead when you computerize.

### Sticking to Basics

Standard accounting applications also offer great potential for profit. A computer can often pay for itself in less than two years in any one of the basic applications, and even more quickly if it is used in several. Sticking to the basic business accounting applications guarantees the most computer performance for your money.

Off-the-shelf, unmodified software packages will give you the most value for your investment. As soon as you begin to modify a package, you begin to lose the benefits you wanted from a package in the first place: low cost and a field-proven product. Modifications are costly and may compromise the package.

Custom software is the most expensive type, and may be less reliable since it has never been fully field tested. Later on it may make sense to develop your own programming capability or to buy custom software, but if you are buying your first computer, start with reputable packaged software.

If you do buy off-the-shelf software packages, you should stick to products that have a known track record. There are a number of packages available which have been installed in hundreds of locations and have been used widely for years. Most of these are offered by established software firms and computer manufacturers. With this kind of product available, there is no reason to take a chance on an untested package. Its lower cost or added features won't do you much good if you find yourself constantly having to fix bugs.

### Service Contract?

Some people are convinced that a service contract is an expensive extra. Others are equally convinced that a service contract is both a necessity and a bargain, an inexpensive way to protect an absolutely critical component of their businesses. We consider it essential for the first-time computer buyer, at least for the first year. At that point, you can reevaluate your position on the basis of a year's experience.

Your greatest asset in installing a computer in your business for the first time will be the people who work for you. Some thoughtful preparation can guarantee their enthusiastic support and participation.

First of all, assure everyone that the system isn't going to take anyone's job away. One of the principal reasons for buying a computer is to cut labor costs. However, the savings is almost always realized in terms of greater productivity based on existing staffing and reduction of future additions to your staff. This is especially true in growing organizations.

As soon as the computer is installed, give everyone on the staff a chance to

*(Continued on SR/8)*


# What's the difference between BASIC and Pascal?

in BASIC

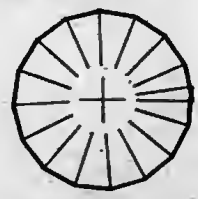
*"This is easy..."*

```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

*"Oops, didn't quite meet..."*

*"...but that's easy to fix."*

```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
                   +25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



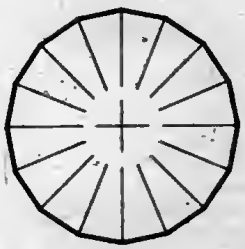
*"Oh, now it closes... in fact, it overlaps."*

Programming by trial and error

In Pascal

*"The simplest circle drawn with line segments is a regular polygon..."*

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var   N: integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N := 1 to Sides do begin
    Theta := 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
          Radius * sin (Theta) + Y);
  end;
end;
```



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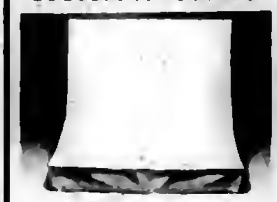

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| 1913 | Teletype 43 |
| 1914 | TI 911 Video Display |
| 1915 | Qume Sprint 5 w/o keyboard |
| 1916 | NEC Spinwriter w/s keyboard |
| 1917 | TI-810 |
| 1918 | DEC LA34 w/s Tractor Feed |
| 1919 | DEC LA-30, LA120, LS180 |
| 1920 | DEC LA-36 |
| 1921 | Centronics 779, 780 |
| 1922 | Centronics 101, 102, 103 |
| 1923 | Qantel 4012 |

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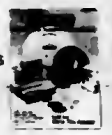


Call: (201) 946-3500
Write: Box 399, Holmdel, NJ 07733

# Buying First System: One Strategy

*(Continued from SR/7)*

become familiar with how it works and what it does. Make sure people understand how it can make their jobs less tedious, more creative and more productive. And emphasize the fact that you don't have to be a computer expert to use the system. Self-training is one of the strengths of small business computers, and you can take advantage of this capability to get people involved.

If some of your people resist the system initially, be patient: once converted, these people may eventually become its staunchest supporters. And be careful not to prejudge who will catch on to the new computerized procedures most easily. Give everyone a chance and you may be surprised.

### Don't Oversell

Finally, be careful not to oversell the system. It offers significant benefits, but it will succeed only if the people using it are willing to make the effort to understand its capabilities and use them effectively.

Try to get only one application up and running at a time. Then, when it looks as though you can turn the job over to the computer, don't. Run both manual and computer system in parallel for at least a month before you depend on the computer totally. You can use this break-in period to solve the problems that will inevitably appear.

Start with the easiest, most straightforward applications. Pick an application in which the software package most nearly matches your current manual procedures, the existing data is well organized and there is a minimum of pressure.

In the course of getting this first application running, you'll have to deal with any number of minor problems, most of which you'll solve easily. But you will be a lot better off getting these nitty-gritty details out of the way before you get into the more difficult applications. Then, with fewer distractions, you'd be able to put all your energy into solving the real problems.

Buying a computer isn't like buying a car. You've bought cars before, and you know what you want. Chances are you have never bought a computer before. You need help! The most cost-effective way we know to get help is to pick a computer vendor carefully, discuss your requirements in depth and realistically and then trust the vendor to help you make an evaluation of your technical requirements. Trust your own judgment when it comes to evaluating the business side of the computer installation, but trust the vendor on the technical questions.

The day the new system comes in the door, it should have more capacity than you think you need. Given the inevitable degree of uncertainty in your estimate of your needs, buying a computer that is already at or near its capacity means you run the risk of being cramped and frustrated before the system pays any dividends. Then you'll be back to ground zero, without really getting up to speed. Having enough capacity from the start to carry you through for a year or two gives you a better chance to make the system succeed, and it will let you grow smoothly.

By the same token, you should buy a system that is not only big enough to begin with, but which can expand easily. Then, as your business grows, you will be able to expand the system simply by plugging in additional memory modules, adding terminals or adding a larger disk memory. You should even be able to upgrade the speed and processing capability of the computer itself without getting a new processor.

Finally, you should buy a computer that is part of an integrated, compatible family of computers. Then, if you need to move up to a new level of computing power, you will be able to do it without having to discard all the software, peripherals and procedures you are using on your first computer. By that time, your investment in the original system will be substantial, and losing it will be a big step backward.

*Boni is a sales manager at Data General Corp.'s General Distribution Division. This article was excerpted from* The Insider's Guide to Small Business Computers, *which is available for $6.95 from DG, Mail Station A-223, General Distribution Division, Westboro, Mass. 01580.*

# Insurer Reduces Processing Lag

*(Continued from SR/6)*

In short, "the statement gives the agent all the information he needs, whether he has one policyholder or 15," Smith continued. During the summer, he added, the Datasystem prints more than 800 statements in one and a half hours, allowing mailing during the first week of the month.

To give the agents timely notice, the Datasystem 310 sorts and prints expirations by agent account numbers and supplies the listings on one form. This gives them three months' advance notice, which is sufficient time for contacting the insured. The agent requests the renewal on the form and returns it for entry into the system. Printing the expirations normally requires less than 30 minutes.

The firm uses direct mail extensively, not only in dealing with its contract agents but also with other independent agents. The Datasystem 310 produces labels sorted either by name, state or Zip Code. In-force policy listings and mail lists are the most time-consuming printing operations, normally requiring two to four hours. However, they may be done in small sections, so the computer is not tied up.

The Datasystem 310 "reduced my expenses, increased my cash flow and allowed us to give better service to our agents," Smith stated. "We obtained the system through a third-party leasing firm for $466.28 per month, while paper costs are about $30 per month. The total is less than one-half of the service bureau's charges. If we tried to do the same work manually, I estimate it would cost more than $16,000 annually in clerical time."

Smith pointed out that savings are primarily those of cost avoidance, rather than reduced staffing.

As business continues to grow, Smith anticipates using a system with a hard disk that stores up to 5M characters.


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## *Avoid Dependence on One Vendor*

# Package Interface Headaches Can Be Eased

By John J. Sterbeck
Special to CW

NEW YORK — "It peels, it grates, it babysits for your kids, enhances cash flow and interfaces with any kind of accounting system package you may be using. It is also available in a variety of colors, sizes and languages."

While such claims may not be part of every software sales pitch, a lot of vendors are marketing their packages using methods popularized by late-night television. Although this method is not usually used with mainframe packages, it is not unusual with many mini and micro software systems.

The distributor of mainframe software can and must provide a comprehensive package for the sophisticated user with a staff thoroughly versed in the language and operating system utilized by the package. But the typical mini or micro user does not, nor should he, maintain this type of staff.

This is not to say that all interfaces between packages on small computer systems are objectionable. Integration, when optional, is desirable. It is most efficient when data can be automatically passed between packages, such as one for order entry and another for accounts receivable.

The key work here is *optional*. If I choose to buy my accounts receivable package from another vendor, what penalty will I pay? Do I, in fact, have any choice? Can any other software vendor assist me if I become dissatisfied, for any reason, with the current vendor?

It has been my experience that program modifications necessary to interface to existing systems exceed, in many cases substantially, the cost of the new and/or old package. The less dependence on any one vendor's software the better.

### Routes of Protection

There are several ways for a potential purchaser to protect himself:

1. Purchase software that is available from more than one source. Many software authors market their packages through agreements that allow a vendor to supply software to an end user for a license fee. The vendor makes his profit from a combination of marking up the license fee and installation charges.

The end user has the option of seeking help from the author directly or through another vendor of the same packages if the original vendor proves unsatisfactory.

2. Purchase the rights to modify the source code. In most cases, modification will void any software warranty you might get from the vendor, but you wouldn't be making the changes unless the same vendor had not performed to your satisfaction. Be sure the language used is one in which you might readily find another source of assistance. This is not to say that you must limit yourself to Basic, Fortran or Cobol, but rather that you should avoid any language that is proprietary to the software vendor.

3. Assure yourself that the interfaces between packages are kept to a minimum. It is far better to reenter some data than be dependent on interpackage transfer. The degree to which you should avoid this dependence on one and two above. The more flexible your vendor options, the less concern you need have for this point.

4. The package should do little, emphasis on *little*, more than its name implies. An accounts payable package should collect the data necessary to print vendor checks. If as an *option* it collects some data for the general ledger package, you should not be required to enter general ledger data if you do not have that package, nor should the data be totally unavailable to a general ledger package from another vendor. The same rule holds for any package mandatory interface is to be avoided.

All software vendors look forward to a long and happy relationship with a customer. The better prepared the customer, the better that relationship will be. Mutual independence is the best path to that success.

Choose the package that does the immediate job; the small package that gives the desired results. The chances are, if you are pleased with a software vendor, the vendor can provide an interface between its packages.

*Sterback is the vice-president of King-Smith & Associates, Inc., a computer consulting and applications software firm based here and specializing in mini- and microcomputer systems.*

*It has been my experience that program modifications necessary to interface to existing systems exceed, in many cases substantially, the cost of the new and/or the old package. The less dependence on any one vendor's software, the better. There are several ways for a potential purchaser to protect himself.*

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DATA SYSTEMS FOR INDUSTRY


# Service Should Claim High-Priority Status Among Selection Criteria

By David Fusco
Special to CW

After working with minicomputer and small business systems for more than five years, one can't help but collect a number of personal horror stories, anecdotes and user trivia.

My first encounter with a minicomputer was in 1975 at a Dallas company. The system was supplied by Mini-Computer Systems, Inc. of Elmsford, N.Y. and consisted of a Data General Corp. Nova 2 CPU, a Teletype Corp. Model 33, a Data Printer Corp. 600 line/min drum printer, four Diablo Systems, Inc. 10M-byte disk drives and four Haseltine Corp. 2000-B CRT terminals. The computer ran under Mini-Computer Systems' Micos operating system.

I began using the system simply as an operator. I had been warned, during my interview for this job, that there were "a few problems" with this recently installed system. I quickly found out that the software — both applications and operating system — was far from perfect.

Corrections to the faulty software involved numerous long-distance calls (at my company's expense) to the hardware vendor in New York and even more calls to the software house in Montreal that had written the applications software under a subcontract from the hardware vendor. Although both of these companies had an obligation to get our system "up and running," people at both companies were frequently "not in," "at lunch" or simply indisposed.

Coupled with these problems was the fact that the four Diablo daisy-chained disk drives frequently caused the system to "Abend Task" at the highest severity level. After the expense of having the Diablo service people come out to diagnose our sick disk drives, we were told to bring our four very heavy, but delicate, disk drives into their Dallas office — they would not come to our location anymore, since they could not find any problems.

I finally took a shot in the dark and applied my audio experience to the situation. Noticing that the daisy ribbon cables between the disk drives were excessively long, and knowing that audio speaker cables of excessive length can cause signal loss, I ordered cables of the Winchester variety with a length that was more in keeping with the small distance between the four disk drives.

I developed some credibility with my superiors. We had no further disk drive problems and no more "Abend Tasks."

## Software Solutions

As for the software problems, I finally took it upon myself to learn the system's Extended Basic applications language and to become as educated as possible about the Micos operating system.

The excutives at the company at which I worked were initially not too enthralled about my newly found software knowledge. They did not want me "experimenting" with their expensive system. The software people at both the hardware and software houses, however, were elated. They probably thought that if I could learn how to fix their system, they'd have my company off their backs. So these people explained to my supervisor, in what must have been a believable manner, that I should most definitely be allowed to work with the system. After all, what harm could I do and/or what did they care?

Upon later discovering that I was, indeed, learning the applications language and software, the executives at my company jumped at the opportunity. Here was their chance to finally get their minicomputer system properly running, make necessary modifications and get new programs implemented. Needless to say, I was, from that point on, kept quite busy. And things vastly improved. My company's long-distance phone expense for computer-related calls dropped from $3,000 per month to almost nothing.

I found the education I got during this one-and-one-half year experience to be multifaceted. I successfully applied it to other companies at which I have been employed (as a systems programmer) and finally to my own company, almost one year old.

## Some Pointers

Let me iterate a few points from my experiences:

When you are considering purchasing anything as expensive as computer hardware/software, consider the source. If it is miles away, does it at least have service representation in your area? Sometimes, people thousands of miles away just cannot be too concerned about your problems, even when they should be.

Will the vendor let you talk to some of its other customers — and not just the happy ones? If a vendor rep says he has *no* dissatisfied customers, he is wasting his and your time. Besides, the more people you speak to, the more valuable information you will receive — even if you simply get a tip concerning the placement of your equipment.

Sometimes most importantly, be very careful where software, especially application, is concerned. Beware of software vendors that tell you about their tailored "off-the-shelf" application packages that were especially designed for companies like yours (you know, the ones that will need no modification).

Make a note of those vendors that stick with you closely during your examination of various minicomputers and hardware/software. If they are interested in providing your software, they should know or at least be learning something about your business.

And, most certainly, do not feel the least bit ashamed if you ever do not understand what the vendor rep means when he mentions a bit, byte, CPU or any other computer term. Simply ask him to explain what you do not understand. If he cannot, maybe you should look elsewhere for your supplier.

*David Fusco is president and founder of Microware Associates, a consulting firm based in Arlington, Texas.*

## *Before Programming*

# New Users Must Tackle Problem Analysis First

By James M. Tharrington
Special to CW

STAMFORD, Conn. — A product that originated as an expensive toy is now rapidly penetrating the business environment.

While a great many microcomputer users still occupy their machine's times with the standard games and personal check-balancing routines, a lot of small businesses are turning to the micro to handle payroll, accounts receivable and other business chores.

Most business users clamor for "canned" solutions to a multiplying variety of business problems. Unfortunately, many of these canned solutions do not do what they promise.

After acquiring a microcomputer, the new owner invariably sits down with book in hand to begin writing programs, having been led to believe that programming is simple.

However, one crucial element is missing. Usually the neophyte programmer doesn't take the time to carefully and thoroughly identify the problem's parts and their interrelationships; and in the majority of cases, the problem is simply not being thought through.

The key to solving any problem is in understanding its complexity. Is any structure built without a blueprint? Of course not. The architectural analogy applies because the blueprint represents the analysis of a problem, with its solution presented in a visual form.

In data processing, there is a similar process. Prior to the actual "construction," or writing, of program code, the problem should be analyzed, evaluated and solved on paper.

For solving data processing problems, the tool most similar to the blueprint is the flowchart, a graphic (symbolic) description of a solution to the problem. While flowcharting may not work for every problem, the microcomputer user should always invest some time in identifying the components of the problem before writing a program.

### Expensive Lesson

Everyone in the industry has stories to tell about people who learned the hard way about the importance of planning. I have a friend who, over a period of time, has invested some $9,000 in microcomputer hardware. On top of this, he has spent more than $1,500 for software purchased by mail and literally hundreds of hours trying to get the software to run or modifying it to his specific needs, not always successfully.

My friend spent very little time in the beginning of his involvement with computers on analysis of his needs or planning, but instead concentrated on "getting things to work." He has grown much wiser, but it was an expensive lesson that left a bitter aftertaste.

A small mail order firm that maintains its mailing list on a microprocessor had an equally distressing experience. The firm, not anticipating any changes to its mailing list, had optimized the number of records it could fit on a diskette. With microprocessors, every byte is important! While it is customary to optimize the use of space in a record, however, it is wise to leave some expansion space for contingencies.

For instance, when the Postal Service announced the forthcoming expansion of Zip Codes from five positions to nine positions, this firm was left with no space available on its individual customer records. To handle the proposed new Zip Codes, the company will have to undertake a substantial conversion in both its files and the programs that access these files because it did not plan.

### 'Native' Ability

As a teacher of data processing, I have found that people can be taught to program, but they cannot be taught to solve problems. They can be given the tools — for example, an explanation of flowcharting or of using algorithms — but problem solving is a "native" ability.

*'Most business users clamor for "canned" solutions to a multiplying variety of business problems. Unfortunately, many of these canned solutions do not do what they promised.'*

Problem solving is thinking — and, as such, can't be taught. Only a person's native ability combined with experience can truly develop and hone problem-solving skills.

Therefore, don't blame your hardware — or even the software package you bought — if your new microprocessor doesn't solve all of your problems.

It may even create some new problems. Successful use of a small computer depends on your solving some problems before you begin to program.

*Tharrington is a partner and principal with Case and Co. Inc., a management consulting firm headquartered in Stamford, Conn., and with branches throughout the U.S.*

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# County Court Makes Case for Micro System

By Sidney W. Frost
Special to CW

COMAL COUNTY, Texas — Although computerized court systems have been around since the late 1960s, only those courts with access to large-scale computers have been able to benefit from their use. While minicomputer-based systems do exist, even these with their multithousand-dollar price tags are unthinkable for small courts with small budgets.

However, there is hope.

Recently, the Comal County court here broke new ground in the application of judicial technology by being among the first to use a microcomputer to manage its court cases and keep track of the people involved in these cases. The micro was developed by Justice Information Management, Inc. (JIM) of Austin, Texas, and not only can it track cases and people, but it can assemble information required for statistical and management reports.

"We were too small to afford a big computer and too large to continue doing everything manually," according to Judge Robert T. Pfeuffer of the 207th District Court of Texas. Pfeuffer, who was instrumental in bringing the microcomputer-based system to Compal County, admitted that officials were considering a word processing system until they heard about the JIM/100 system.

"The JIM/100 gives us the same capabilities as the larger counties but at a cost we can afford," he claimed.

### Design Objectives

The designers of the system, Jim Dunlap, an attorney and former court administrator, and Joe Lucas, a computer specialist, were both involved in implementing a much larger version of the system when they worked for Harris County in Houston.

Dunlap, who has worked as a court administrator in Texas and Georgia, said, "Our objectives in designing the system were to make it simple enough that even I — a layman to computers — could operate it, and cheap enough to install in any courthouse in the country."

"It's very cost-effective because it's so easy to use. The customer doesn't have to have any data processing knowledge and no programmers are needed. We provide everything: the hardware, software, training and data conversion," according to Lucas, who programmed the system and patterned it after the one he implemented in Houston.

The heart of the JIM/100 is an Alpha Micro, Inc. computer system which was selected after a year-long study of available microprocessors. The system installed in Comal County includes three CRT terminals, two printers and a Control Data Corp. disk storage device. Additional equipment and capabilities can be added as the need arises.

### Menu-Driven System

The software, written in Basic, was specifically designed for users with no data processing experience. It is a very nontechnical, menu-driven system. The user starts with a general menu which can easily be linked to more specific menus until the desired function is located and performed. Control automatically passes back to the previous menu after a function is accomplished.

The master menu lets the user select one of the following:

1. Name Inquiry.
2. Case Inquiry.
3. Person File Maintenance.
4. Case File Maintenance.
5. Docket System.
6. Code Table Maintenance.
7. Batch Reporting System.
8. Log Off.
9. Help.

Entering one of the function numbers, 1-9, takes the user to the next screen. Entering function Number 1, for example, would bring up a screen asking for the name, plus some optional qualifiers such as race, sex and date of birth, of the person the user is interested in. Upon entering the name, a display would follow showing everything the system knows about the person and the cases the person is associated with.

If function Number 5, Docket System, had been selected from the master menu, then the operator would get another menu from which to choose, containing such things as:

1. Set a Case.
2. View a Case.
3. Enter Results of a Docket.
4. View Results of a Docket.
5. Define a Docket.
6. Reset a Docket.
7. View All Dockets for a Day.
8. Enter Results of a Setting.
9. Docket Batch Reporting System.

This same approach was successful in Houston and greatly eases the training tasks since the displays and functions are written in a language easily understood by county personnel. Comal County's court administrator, Martin Allen, also worked in Houston and had no trouble learning to use the Jim/100.

### Micro Capabilities

Lucas, whose previous experience has been with only large computers, was amazed and pleased with the

*(Continued on SR/16)*

Why call in a dozen different companies to service your data communication equipment?

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# High-Level Small Systems Take on Variety of Roles; 'Best Buy' Often Unclear

By Jerry Kluenshin
Special to CW

Small computers have evolved to a point where they are now both affordable and "friendly" enough to operate effectively in a small business or large corporation.

Innovations in hardware and software technology have created a situation where a wide range of products — from high-priced toys costing several hundred dollars to sophisticated business tools priced at less than $30,000 — are available to both types of prospective user. However, the distinction as to which type of small computer is the "best buy" for which user is often unclear.

From small businesses, we typically get the following questions:

- Can I get some real use out of the system within a month?
- How long will it take me or my operator to learn how to use it?
- How many CRT terminals can I get?
- Does the machine have a data base capability?
- Which vendor solution should I buy?

And from large corporations, we hear:

- Can the computer grow with the needs of my office?
- Can it communicate with our host mainframe?
- Can the small computer's software be transported to other systems?

The bottom line is that small businesses want to take advantage of low-cost automation without changing their business styles or their people to suit a machine. And large corporations want to use small computers as stand-alone tools for solving problems that can not be cost-effectively solved with larger systems.

### Eye on the Long Term

When choosing a small system, first-time users sometimes consider only their present needs. But experienced users have learned to take a closer look at their long-term applications needs.

In order to help them avoid becoming second-time users too fast, we recommend that novice users enlist the services of a software specialist to review the necessary performance needs. A lower performance computer, such as a home computer, generally has limited storage and instruction-handling capacity, a single terminal, no data base capability and limited software. Clearly, although inexpensive, a lower performance computer is not for those whose business depends on a computer, or who have little programming knowledge.

High-performance small computers in the class of the Hewlett-Packard Co. 250 generally sell in the $20,000 to $30,000 range, but offer many powerful large-system features such as a data base manager, editing tools, multiuser growth and so on that make them truly practical business machines. Following are some capabilities to look for:

1. Multiple full-power terminal capability. A system should be able to grow to handle multiple remote terminals so it can be used simultaneously by more than one user in production, accounting or other areas. (Single-terminal systems are generally insufficient to cope with growth in small manufacturing or distribution firms.)
2. A data base system that allows quick answers to management questions.
3. Extensive and expandable storage.
4. Communications. A small computer should have the ability to communicate with a larger mini or mainframe in the event the company grows and the small computer can be used as

(Continued on SR/16)

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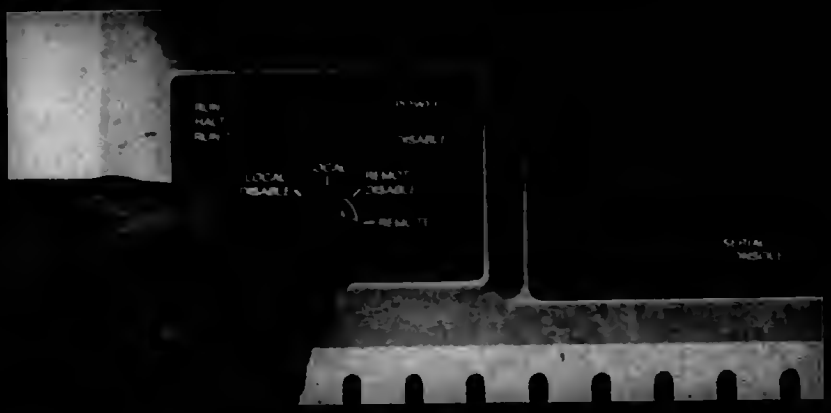

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*Recent Application for Minis*

# Personnel Record Systems Present Own Pitfalls

By Edward S. Goldmacher
And Joan A. Mitchell
Special to CW

The minicomputer is sending shock waves through the data processing industry. Small, yet amazingly fast and powerful, minicomputers are coming at us from all directions with applications that boggle the mind.

One relatively new application for the minicomputer is the human resource information system. Unlike the original concept of a computerized personnel system 12 to 15 years ago, the idea of applying the minicomputer to personnel record-keeping functions is finding almost instant acceptance. Additional record-keeping burdens imposed by legislation, employer awareness of the computer's role within corporations, and a higher level of sophistication in the personnel function of most organizations has led to this rapid acceptance.

Aside from the relatively low initial investment cost, the most intriguing aspect of minicomputers is their instant start-up capabilities. It is not uncommon for a manufacturer to offer a large selection of application programs along with the purchase of the hardware. Typically, within 60 days the machine is delivered, uncrated, plugged in and ready to go.

However, a word of caution is in order. Because minicomputer-based systems are admittedly flashy and attention-getting, many vendors appear to be selling the "sizzle" and not the "steak."

In many organizations, a payroll can be quickly defined or an inventory system easily documented; nevertheless, personnel record-keeping has its own set of criteria and its own pitfalls. Consideration of the following points before reaching an expensive and long-term decision may be helpful.

First, why even consider a minicomputer? For many organizations, this may be the only way to obtain data processing capabilities in the personnel function. The mini can be applied across the entire spectrum of organizational size, from the very small (where the minicomputer will be the only processor) to the very large (where the information processing function is looking to offload some applications from the host mainframe and put them on a network of dispersed minicomputers). The user must assess the personnel function's needs in light of overall processing capabilities.

A second point for consideration is the fact that payroll capability on a minicomputer is rare at this time. Although many vendors voice their intent to provide payroll capabilities "in the near future," most do not offer it as a current application. The implication is that the payroll system will run separately on a different piece of hardware.

A separate payroll system is not, in and of itself, a problem until the interface capabilities between the two computers are explored. Some type of communications program between the two machines must be developed or an extract file must be created from one system and used as input to the other. Duplicate record-keeping, reporting and file synchronization could become a significant problem in time and cost.

The separate file problem can be further compounded in the benefits and pension administration area where accurate and up-to-date records (including historical records) are required. In addition, some computers have limited inherent calculation capabilities and rely solely upon the programs to perform the necessary work. As with payroll applications, these programs may not be available, depending upon the vendor selected.

A third and significant issue to be considered is security. Because these machines are intended to operate through input terminals that can be scattered throughout an organization, maintenance of security can be a significant problem. Although many systems provide some type of access code, some have security checks that are more sophisticated than others — and, as has been so often pointed out in the computer industry, nothing is 100% secure.

The problem is compounded by remote terminal applications, where the corporate personnel function may have little or no control. This may possibly result in the need for a company moving into a minicomputer application to assess, evaluate and, if necessary, modify its own security procedures.

Unfortunately for the prospective buyer, this relatively new field is going through many of the same painful, yet necessary, growth phases of the early human resource information system. To capitalize on the concept, a multitude of vendor organizations is appearing on the horizon. Some offer well-developed applications and provide the necessary documentation and support to make their systems effective. These organizations will thrive and prosper.

Other applications, however, have been developed by technically oriented companies with little or no understanding of the personnel function and limited flexibility to handle changing requirements. Although these applica-

*(Continued on SR/16)*

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# High-Level Systems Take Range of Jobs

*(Continued from SR/13)*

part of a distributed net.

5. Software tools to greatly simplify applications development. Such tools are used to quickly create screen layouts and reports, organize data and streamline user programming.

6. Soft key capability. An important feature of high-level small computer, soft keys enable an unskilled operator to call up various screen forms and execute preprogrammed applications with the press of a button. With soft keys, minimal training of operators is required — a plus in small firms where there can be high worker turnover.

7. Support service. Responsive support must be available if a small business is to depend on its computer.

In addition to a long useful life and increased productivity, a third benefit of a well-selected small business computer is startup time. Once a small firm gets the system, it should be up and running — with programs — within a few weeks of installation. Larger firms can afford a few months' delay in startup, but smaller ones seldom can.

Software specialists, or OEMs, are essential to small firms planning to implement their first system. Most OEMs HP works with around the world either began in the field they now service or served the industry as software specialists and service bureaus before small computers became generally available. By focusing on a "vertical" industry, an OEM is able to design hardware/software systems tailored to the needs of that industry.

### In Large Firms

Until now, we have primarily discussed the requirements of small businesses. In large corporations, however, computers valued at less than $30,000 are now proliferating.

Why are departments of large firms buying small computers? It's all part of the increasing pressure on department managers to improve productivity and obtain up-to-date information. In addition, many firms want to computerize accounting functions in branch offices. Branch offices typically require a number of stations, good response time and a data-base capability to allow manager inquiries for decision making.

While networking applications are the most common for small computers in large organizations, many of these organizations are also finding it cost-effective to run a small computer as an outpost — particularly in situations where on-line inquiry/response capabilities are needed but access to a central company data base isn't.

A small computer in a large organization can be compared to the tricep muscle in the human body. For this analogy, a mainframe at corporate headquarters can be likened to the heart; the distributed computers at divisions, to a bicep muscle in the arms; and the small computer, which complements divisional functions and handles data for departments and remote offices, can be likened to a tricep, which is used for less heavy extending.

In conclusion, the market for small systems — both in large and small organizations — continues to grow as inflation forces firms to increase automation. High-level small systems — differing from large systems only in terms of disk, main memory and instruction-handling capacity — promise to become the preferred choice as the body of experience users also grows.

*Jerry Klemushin is sales manager for the Business Systems Program at HP's General Systems Division.*


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# Personnel Systems Pose Unique Pitfalls

*(Continued from SR/15)*

tions are flashy and "machine-efficient," they do not address the underlying issues and leave an unsuspecting purchaser with hardware and software of little or no value.

The value of a package to the user always has been the ability to gain reasonably priced software with the development costs divided among the users. For an organization willing to comply with the prestructured environment developed by the vendor, the packaged approach will provide the greatest economy. For an organization requiring "nonstandard" applications, careful and thorough examination of the proposed package and subsequent negotiations with the vendor must be carried out.

One final point should be kept in mind: Because of the unique package characteristics of minicomputer-based systems, interaction between the client and the vendor will be minimal. Actual on-site vendor time will most likely be devoted to the delivery and installation of the machine and the subsequent user training time. It will be up to the client to decide which data is to be collected, how the collection is to be made and how the conversion will take place.

For the immediate future, "caveat emptor" again applies. Although minicomputer-based human resource information systems will provide capabilities not currently possible in the large mainframe environment, the procurement of such a system requires as much research and knowledge as any other computer-based activity.

Organizations contemplating a minicomputer for personnel use, either as a first system or as a replacement to a current system, should first analyze their data requirements. Once requirements have been studied, a request for proposal should be distributed among potential vendors. Vendors and products can then be evaluated based upon these criteria, and a logical decision on the purchase can be reached.

*Goldmacher is a consultant on human resource information systems and Mitchell is a word processing systems specialist. Both are with Towers, Perrin, Forster & Crosby, a management consulting firm in Chicago.*

# Court Makes Case for System

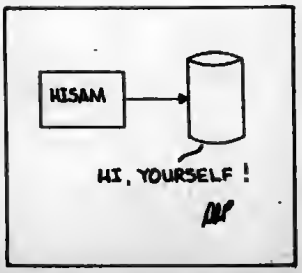
*(Continued from SR/12)*

micro's capabilities and response time. "Of course we've got a smaller data base here," he said, "but this system responds just like the 370 did in Houston."

Currently, Comal County is looking into the possibility of allowing neighboring countries access to their system via remote terminals which are also supported by the Alpha Micro system. "We do a lot of business with the same people," Judge Pfeuffer said, "and by providing them access to our records, we could prevent rescheduling of cases due to conflicts of attorneys and others involved in a case."

Right now, the system only tracks cases while they are in the courts. However, county officials are already looking into adding to the system at both ends of the judicial process. For criminal cases, for example, they want to add to jail booking system and a probation monitoring system.

*Frost is a freelance writer living in Austin, Texas.*





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## *Right Hardware-Software Combination*

# System Fills Dental Lab's Specialized Needs

Special to CW

JENKINTOWN, Pa. — While many small computer systems seem to offer the right features to fill standard business needs, few have the right hardware and software combination to satisfy specialized applications.

Jaslow Dental Laboratory, Inc. is a small business engaged in the manufacturing of dental prosthetic appliances. It is located about five miles north of Philadelphia and employs about 55 people.

Every dental laboratory has a method of entering and tracking cases through the laboratory and it usually consists of a work ticket produced in triplicate. The work ticket is a simplified version of a doctor's prescription and breaks down the procedures necessary to make an appliance, as well as the expected completion date. In a small-scale operation, inventory is normally done by hand.

However, if the lab's work load should expand, as in the case of Jaslow, the paperwork and correlation of data by hand can become a nightmare. Therefore, a computer would seem to be the logical solution to such problems. That is, if you can find the right system.

### System Search

In its search for the perfect system, Jaslow examined a number of computers and turnkey packages. One of these systems was offered by Data General Corp., but while the hardware was basically good, the vendor recommended using another company's processor, which meant dealing with two hardware vendors. Having no experience in computers prior to this, the dental appliance maker found this approach confusing.

The company also looked at Burroughs Corp.'s B80 computer, however, in the demonstration, the machine didn't work. After 30 minutes of fumbling with the computer, a report finally came out of the printer. When problems were finally solved, the computer proved to be very slow in processing, although it had a number of bells that went off and made a number of official-sounding ticks.

In the middle of all this looking around, Jaslow was using a DP house for processing our data once a month for accounts receivable and weekly for payroll. The local company was bought out by a larger company in New York and the new representatives came out to our business and told the firm of all the wonderful data they were going to give it with their new system. At the end of the first month, the company had lost one week's worth of billing and not aged any of the accounts.

Jaslow returned the data for a rerun after they located the missing week and on the second run, the aging was done, but no service charges were included. The staff spent a weekend recreating the information and adding the service charges to the accounts and managed to get statements out by the 12th day of the month.

The next month, the statements reflected the data from the first run of the prior month, so the company again could not send out statements. This led to a stepped-up look into the computers and a firm commitment to buy and develop its own in-house data processing.

Further considerations went into purchasing a computer. Being a production system, down time was very critical and field support very necessary so that day to day productivity is not affected for long periods of time in the event of a breakdown. IBM showed Jaslow the Series/1 with a sealed fixed disk that is not sensitive to dust and dirt that all laboratories make and most computers cannot function in.

In past dealings with IBM, the firm had found its field support and service to be excellent and response time on service calls is thought of in terms of minutes, not hours, days and weeks.

### Software Decision

After making the decision on the hardware, the problem of software was next to be overcome. After talking with many software firms Jaslow decided to go with a local software company that had personnel that it felt it could get along with and would best understand what the firm wanted the end result to be. Some of the programs were modified canned programs and some were written from scratch.

Canned programs were used when the changes needed were minimal and entire programs used when the need was so specialized that nothing offered would fit. The company purchased the Series/1 from IBM, signed the software contract and was on its way. Instead of having the hardware delivered to its location, Jaslow chose to have the computer delivered to the programmers out of our shop and out of the way of production. The only drawback was all the running around back and forth from the programmers' office to the main office.

The system has been operational for a year and a half, and the information the company now gets that it did not have with the service bureau is worth all the effort and money put into it, Jaslow reported.


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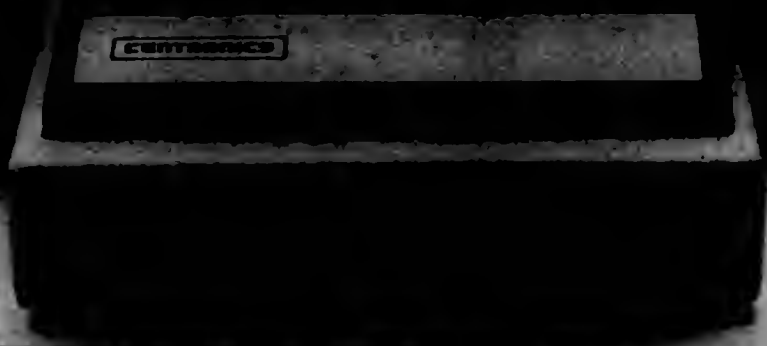


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*Handles $12 Million in Sales*

# Mini Handles One-of-a-Kind Art Inventory

Special to CW

NEW YORK — Fourteen years ago Kennedy Galleries, today one of the country's largest galleries of American art, had a little more than $1 million in annual sales and an inventory that was kept on a limited card-file system.

The times, and the gallery, however, have changed. Currently, Kennedy Galleries has about $12 million in sales, more than 15,000 pieces of art that fill the entire fifth floor of the Squibb Building here and two additional warehouses and a minicomputer system to handle accounting and inventory control.

"We are a small business, a typical business in many ways, except that our inventory is made up of one-of-a-kind artistic works that range in value from $500 to $500,000 — and are appreciat-

*(Continued on SR/20)*

Lawrence Fleischman, Kennedy Galleries' chief executive officer, has information on every piece of art owned by the gallery at his fingertips.

All aspects of the gallery's operation, including sales, inventory and accounting, are handled by the minicomputer.


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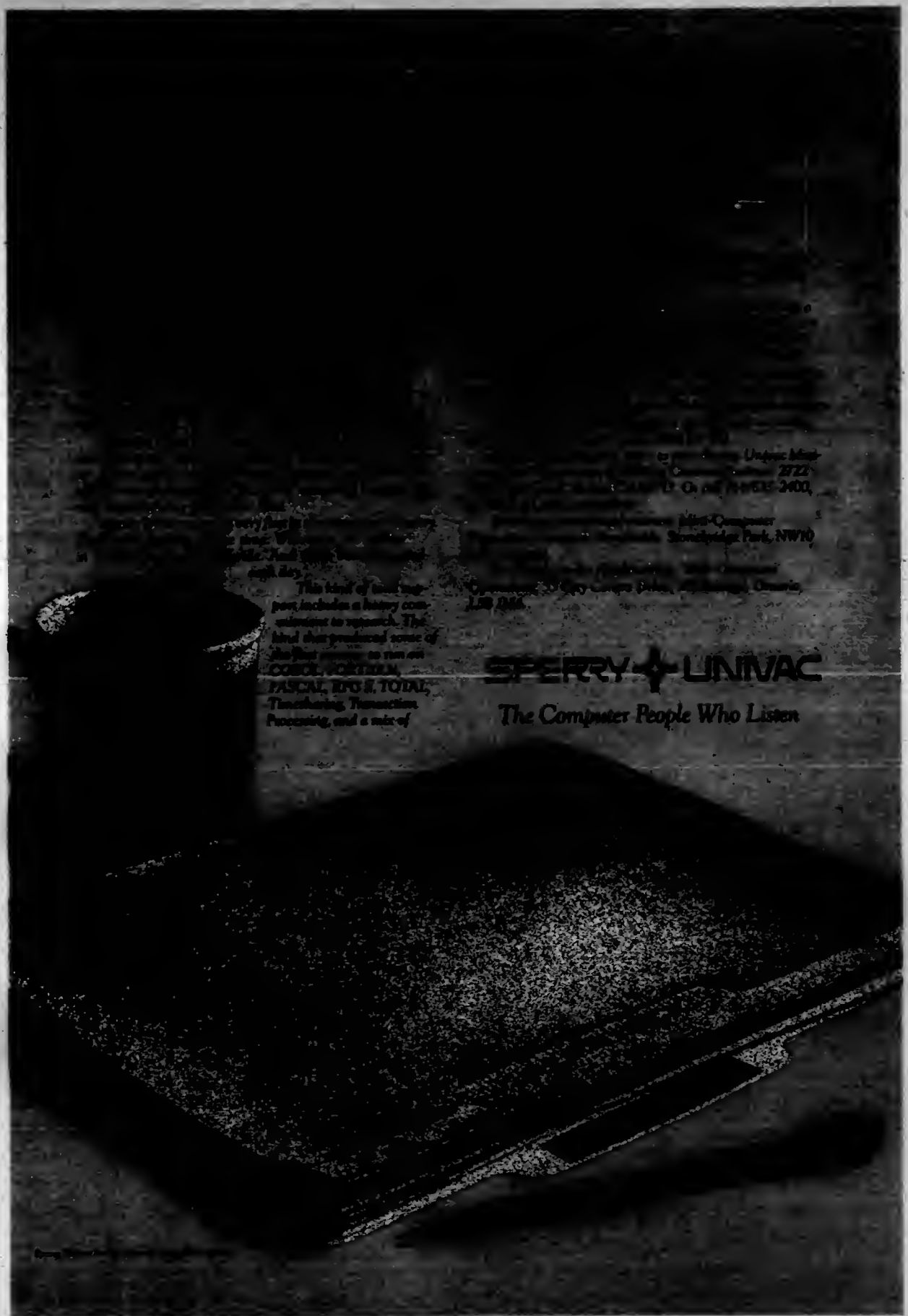
SPERRY UNIVAC
The Computer People Who Listen

# Mini Handles One-of-a-Kind Art Inventory

(Continued from SR/18) ing all the time," Lawrence A. Fleischman, Kennedy's chief executive office, said. And "keeping track of each piece of art is a serious part of our business."

A Texas Instruments, Inc. DS990 Model 8 computer system keeps the gallery running smoothly. The system includes five Model 911 CRT terminals located throughout the gallery, two 50M-byte disk drives, two 150-char. Omni 800 Model 8N printers and a 300 line/min printer.

The TI computer runs under the DX10 operating system, which enables multitasking. And the computer can, in fact, be expanded from its present 256K bytes of random-access memory to 2048K bytes, and from 100M bytes of disk storage to 400M bytes.

Micromedia Applied Technologies, Inc. custom-designed the software for Kennedy, using Cobol language with TI's Tiform 990 forms-generation package and TI's DBMS 990 data base management system.

"We have the quantitative concerns of any business, including R&D, marketing, sales, investments, maintenance and collection," Fleischman continued. "And, then, of course, we have the qualitative concerns associated with the arts. For the quantitative work — like inventory control and accounts receivable and payable, I rely on the computer. For the qualitative judgments, I rely on myself."

Fleischman and his partner, Rudolph Wunderlich, have CRT terminals in their offices. "I can do more; at my fingertips is information on every work we own — from when we bought it to where it is at this moment. And, keep in mind, we have from 200 to 800 pieces on loan constantly," he commented.

Twice each year, Fleischman reviews Kennedy's entire inventory to check on valuations. He also checks on trends in sales and inquiries, so he can sense what's in vogue and where.

"I can tell you, for example, that right now my clients in California are asking about paintings quite different from my clients in Illinois," he explained.

### Reporting Capability

Kennedy Galleries also has a reporting capability built into its system so that every time an employee inquires for a client about a particular painting, a period or trait, the information is stored on the computer.

Fleischman can then retrieve a frequency distribution report from time to time to help in planning acquisitions. "As a result, I'm able to purchase works of art with some knowledge that there is clearly a market for them," he said.

Fleischman and Wunderlich are not the only ones at Kennedy who consult the computer on a daily basis: so do the sales representatives, the accountant and, of course, the registrar (who is responsible for maintaining the inventory).

"Our sales force can help our customers in quite an extraordinary fashion," Lillian Brenwasser, Fleischman's assistant pointed out.

"For each piece in our inventory, we have stored in computer memory 25 pertinent descriptive details, including the artist, period, type of work, medium, subject, size and other facts, such as characteristics of the artist and even whether the piece is framed or not."

In addition, employees can call up financial information, such as an item's cost and selling price, by using simple commands at the CRT terminal.

"All this makes up our data base, and it's cross-referenced so I can, quite literally, call up for you a list of all of our Winslow Homers in which there's snow on a rooftop. If, of course, that's what you asked about," Brenwasser said.

When a piece of art is sold at Kennedy Galleries, the transaction is entered on the computer, and the inventory is automatically updated. "Our inventory control system and accounting system are really all tied in together.

"With data base management, redundancies are eliminated in our general ledger, accounts receivable and payable and subsidiary accounting," Fleischman said.


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In all, there are more than 30 screen formats.

Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

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**Honeywell**

*And Helps Administration*

# School System Mini Schedules 14,000 Students

By Rickey W. Parker
Special to CW

CHATHAM, Va. — Just as minicomputers have moved into industry, they have also moved into the educational system.

Recently, the Pittsylvania County school system here started using a minicomputer to schedule secondary school classes and administration.

Although this is not the first time computer scheduling has been used, it is the first time the school system used an in-house minicomputer to do the scheduling. Not only is scheduling within the division cost-effective and efficient, but it provides a plethora of additional spin-off services.

The computer used is a Wang Laboratories, Inc. 2200 MVP with 64K bytes of random-access memory and 10M bytes of disk storage. Programs are written in Wang's Basic-2, an extension of the traditional Basic language. In all, the computer keeps track of the academic activities of some 14,000 students living in and around this south central Virginia community.

Many people cautioned against attempting to schedule on a minicomputer, implying that this was a job for a mainframe. Unfortunately, a simplistic approach such as arena scheduling was not acceptable. Instead, an optimizing method was adapted that incorporates a comprehensive balancing scheme. This method relies heavily on the high-speed sorting capabilities of our computer.

The program developed for Pittsylvania's schools is called Computer Priority Scheduling (CPS). It is the priority system that allows the computer to make decisions as to whether a substitution should be made for a particular course or which course should be dropped when a conflict cannot be resolved.

The guiding principle behind this method is to provide the maximum number of students with the courses they have requested. The computer generates a suggested master schedule that, if followed, would produce the least number of conflicts for that particular school.

In addition to the printing of schedule cards, class rolls and homeroom rolls, the program interfaces to a student data base. This allows the inclusion, where appropriate, of student data for use in preparing attendance registers and other administrative documentation.

The centralized scheduling has provided many benefits as a result of required standardization of course names, numbers and student data.

### System Characteristics

Some specific characteristics of the method are:

- The algorithm will produce the same schedules for each run if the data and scheduling parameters are unchanged.
- Scheduling starts with the highest grade. Within a given grade, the students are scrambled, giving each student within that grade an equal chance of receiving the courses requested.
- The student requests the course while the program assigns the student to a particular section of that course.
- The program balances on enrollment, with a secondary balance on race. The balance is programmable.
- The set of courses requested by a particular student is sorted into a priority

*(Continued on SR/30)*


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## Now, Ramtek offers the first integrated system for MIS graphics users.

Ramtek's new 6214 color graphic computer frees you from buying each of your display elements from a different supplier. Ramtek has put it all together in a true stand-alone color graphics system complete with processor, monitor, console, mass memory storage and UCSD Pascal.* And full Ramtek support with field service, training and documentation.

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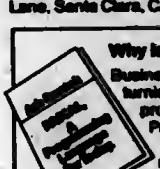

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"Look, I've Known You Since You Were a Pocket Calculator . . ."

# A big week for small computer specialists

The sixth Minicomputer/Microcomputer Conference and Exposition will be held in Brooks Hall and San Francisco Civic Auditorium, October 14-16.

Everything that's new and significant about small computers and systems will be on display on Mini/Micro's show floor and reviewed by experts in the Civic's four spacious auditoriums.

And there are some important extras! The Association of Computer Programmers and Analysts will hold its 10th anniversary conference just preceding Mini/Micro (call (800) 556-6882 for full details) and U.S.U.S. (the UCSD system users' society) will meet for three days during and following Mini/Micro. There will also be a day-long, Introduction to Pascal seminar.

Mini/Micro's professional program, previewed below, offers 60 hours of up-to-the-minute information in 24 half-day sessions.

Mark your calendar now, and use the coupon to request the Mini/Micro detailed preview program, available September 1.

TUESDAY, OCTOBER 14, 9:30 AM

1. The Small Business Computer in the Next Five Years
*S. Henry Socia, Mini/Micro Systems*

2. Pascal Applications in the Minicomputer Environment
*A. Wilson Brown, Point 4 Data Corp.*

3. Professional Programmers/Analysts' Role with Small Computers
*John Prior, Consultant*

4. Impact of New Technologies on Marketing Opportunities for OEMs
*Richard Able, Christman/Able Advertising*

TUESDAY, OCTOBER 14, 1:30 PM

5. Quality Assurance for Small Computer Software
*Murray Zuckerman, Consultant*

6. Are Programmers Really Necessary?
*Richard Dalton, Open Systems*

7. Microcomputers in Banking
*Robert Reffelt, Chase Manhattan Bank*

8. Data Communications for Minicomputer Users
*Roger Evans, Micom Systems*

WEDNESDAY, OCTOBER 15, 9:30 AM

9. Pascal Open Forum: Implementation Interfacing to Existing Systems
*A. Wilson Brown, Point 4 Data Corp.*

10. Design Objectives for Color-Graphics Desktop Computing Systems
*Ed Bride, Hewlett-Packard (DCD)*

11. Winchester Disk and the Backup Issue: What's Happening?
*Larry Hemmerich, Cipher Data Products*

12. Effects of Microcomputers on Marketing *Jim Jordan, Maron Electronics*

WEDNESDAY, OCTOBER 15, 1:30 PM

13. IBM Watching: New Directions for Small Computers
*John Rehfeld, International Data Corp.*

14. Software Evaluation and Selection
*Bill Fisher, Arthur Young & Co.*

15. Session title and organizer to be announced.

16. Current trends in Computer Graphics
*Dr. John Moreland, Megatek Corp.*

THURSDAY, OCTOBER 16, 9:30 AM

17. Latest Armament in the Winchester Revolution
*Randy Knapp, Wespercorp*

18. Data Base Capabilities in Small Computers
*Susan Kolb, Hewlett-Packard (DCD)*

19. Computer Security in the Mini/Micro Environment
*Bill Fisher, Arthur Young & Co.*

20. Information Processing and Reporting: State of the Art in the "Paperless Society"
*Mike Holt, Arthur Young & Co.*

THURSDAY, OCTOBER 16, 1:30 PM

21. Distribution Alternatives for Small Business Computers
*Robert R. Mueller, Office Products Dealer Magazine*

22. Increasing Market Potential for Minicomputer Distribution
*Bill McNamara, Systel Corp.*

23. Systems in Hospitals and Health Care
*Neil D. Kelley, Infosystems Magazine*

24. Session title and organizer to be announced

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☐ Please send me the detailed Mini/Micro preview program (Sept. 1)

☐ Please send details and registration materials for the Introduction to Pascal seminar on October 13.

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It has word processing, data processing, electronic mail, correspondence management, scheduling, automatic proofreading, language translation, networking capabilities – virtually everything you need – all integrated into a single incredibly efficient system.

This means that administrative people can quickly become more efficient because of all the advanced capabilities at their fingertips. And managers and professionals can become more productive because communications will be faster and information will be easier to get.

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This is the basis of all automated offices. The main things to look for are ease of learning, ease of use, and the ability to work with documents of any size.

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Our Word Processing also has management and administrative workstations that provide fast, consistent response time. Powerful text creation and editing facilities. User created boilerplate library. Comprehensive filing and retrieval capabilities. List processing. And letter-quality output from a printer with interchangeable character fonts. In a word, our Word Processing is productive.

**Management Communications and Support.**

This part of our Office Automation System is a natural extension of our Word Processing function. Like Word Processing, it's simple to learn and easy to use. And it has all the features you need to enhance productivity.

Electronic Mail, for instance, has intray processing, note and memo creating capabilities, receipt acknowledgment, and the ability to annotate received messages and to forward documents and notes to an office down the hall, across the city, or around the world.

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It will also support multi-lingual dictionaries for creating foreign language documents or translating one language to another. In other words, *C'est si bon.*

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Prime's Office Automation System is supported by two workstations; one administrative and one management. They both can access all capabilities of the system, but each is tailored to the specific needs of its users. Together, they make a highly productive information management tool.

The System operates on a multifunctional Prime 50 Series computer system. All Prime computers share the same operating system, the same file system, and the same communications products. So no matter what size computer you start with, you can move all the way up to a powerful 750 without piling up bills for recompiling programs or modifying software. In fact, your office system can easily and economically grow to support over sixty users.

In short, Prime's Office Automation System can deliver what you need. So if you're ready for this kind of office, we're ready to deliver the System. If you'd like to know more, write Prime Computer, Advertising Department, 3 Newton Executive Park, Newton, Massachusetts 02162.

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*To Prevent Breakdowns*

# Security, Safety Audits Advisable Measures

By Kenneth A. Eldred
Special to CW

SANTA CLARA, Calif. — Physical abuse, fire and electrical hazards pose three of the most serious threats to any type of computer installation.

Ideally, a protection system consisting of a combination of equipment and procedures should be integrated into the user's mainframe or minicomputer facility when it is built. But, the manager of an existing site with inadequate safeguards can increase protection by conducting a security and safety audit of the operation and identifying weaknesses.

The measures taken — and the money spent on them — should be weighed against the risk of loss and the likelihood of the threat. As the value of the data or the importance of a continous operation goes up, the measures should be stricter.

The most basic form of protection is control over those entering the computer area. A wide range of devices and procedures are available to maintain control, from highly sensitive perimeter sensing and alarm devices to the simple expedients or regular surveillance and combination locks.

A recent report of a fire in Springfield, Ill. [CW, April 14], illustrates several important aspects of fire protection. The fire occurred in a remote data entry facility operated by the Illinois State Department of Public Health and could have been started deliberately.

Large amounts of paper were being stored in the facility. Security was limited to locked doors — no guard was on duty. Apparently there was no contingency plan and, as a result, no off-site storage of records or programs. Although most of the facility's operation programs were eventually salvaged, damage to computer equipment and the facility itself amounted to more than $750,000.

This incident highlights three levels of a fire-protection system. The first is access control: if a security guard had been present or if some form of warning system had been in effect, this building would have been less vulnerable to deliberate attack.

Second, if large amounts of paper had not been stored in the facility, there would have been less fuel to feed any fire that did start. Once detected, a smaller fire might have been controlled and extinguished more quickly and with less damage.

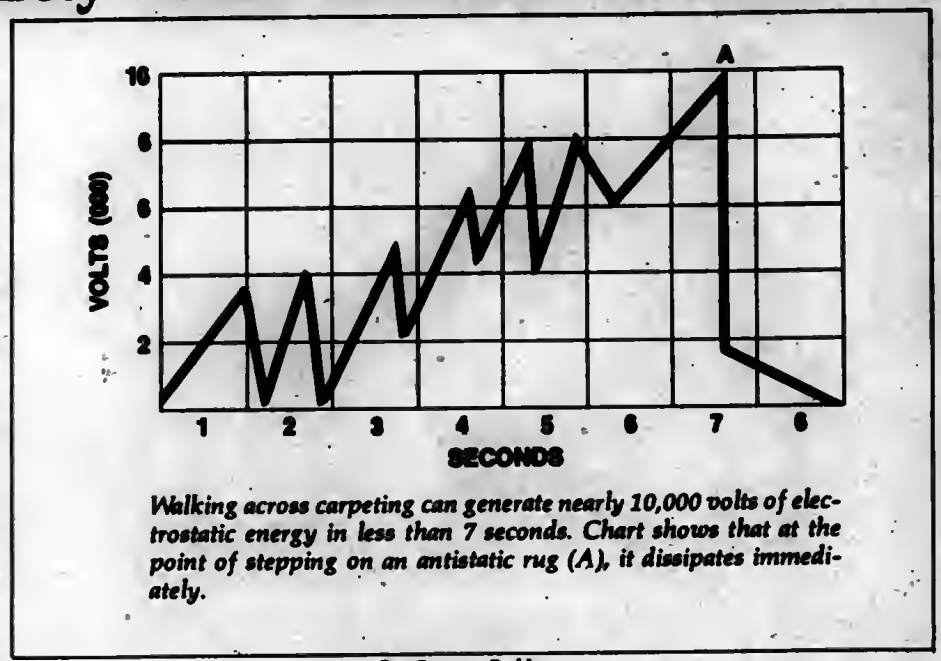
Third, if backup files and programs had been stored off-site, as part of a contingency plan, the facility's operation might have gone on with only a minor interruption. As it was, the staff was kept out of the facility for a day and a half while arson investigators searched through the debris.

In this case, as in many others, the presence of fire extinguishers within the facility was moot, since no one was present to use them. (The facility had no automatic sprinkler system.) Nevertheless, fire extinguishers, especially those filled with a compound known as halogenated hydrogen, or Halon, are an essential component in any computer facility's safety program.

Conventional fire extinguishers are filled with water, carbon dioxide or dry chemicals. Water and dry chemicals are poor choices for a computer room because they can cause almost as much damage to the computer equipment as heat and fire can. Carbon dioxide smothers the supply of oxygen to a fire, but it also smothers the supply to humans. Moreover, it is very cold and can shock electronic equipment.

Halon, on the other hand, interacts with the combustion process itself to extinguish flames and leaves no residue.

Halon has become very popular as an extinguishing agent and is available in virtually any size of extinguisher necessary.




*Walking across carpeting can generate nearly 10,000 volts of electrostatic energy in less than 7 seconds. Chart shows that at the point of stepping on an antistatic rug (A), it dissipates immediately.*

One Common Problem

### Electrical Hazards

Although semiconductors have high switching and storage capacities, they are vulnerable to low voltage. Static discharges or bursts of overvoltage damage equipment by coupling stray electrons into active circuits and wiping out stored data, or by punching microscopic "bullet" holes in semiconductor materials.

Because they are packed so closely together, semiconductor circuit elements can be disrupted or destroyed by very tiny levels of energy — levels measured in millionths and trillionths of a volt.

Static discharges and voltage transients are two major sources of component-damaging and data-erasing energy. Both are inevitable parts of the environment in which a computer system operates. Protection against the threat they pose is, however, simple and relatively inexpensive.

It should be kept in mind that some computer vendors go so far as to specify that equipment damage caused by preventable static discharges will not be repaired under warranty.

Static electricty builds up on humans

*(Continued on SR/34)*

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**Peter P. Blozis, H.J. Wilson Co., Inc.**

PETE BLOZIS:
"I've been in EDP for 19 years and have gone through many conversions. So I anticipated problems in installing our new NCR V-8585M. It turned out to be the smoothest conversion I ever experienced."

LEA EDMUNDS:
"We had good reason to be apprehensive. We were putting in the first V-8585M to be installed anywhere. And, at the same time, we were switching to new operating software, NCR's VRX. We ran parallel for three weeks and never developed a conflict. As it turned out, we could have switched over in a single day."

PETE BLOZIS:
"We resisted conversion as long as we could, and then discovered it was completely painless. The V-8585M hardware ran just as NCR predicted. VRX is more transparent than any operating software I have ever seen."

Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

* * *

WILSON'S is a chain of jewelry/ catalog showrooms that is spreading across the Sunbelt. And growing at the impressive rate of 37 percent per year. This growth has caused Wilson's to step through five NCR Century systems up to the V-8585M. Supporting an NCR system is easy. As Pete Blozis says "We can support our NCR V-8585M with fewer systems programmers than we'd need for other systems of comparable size."

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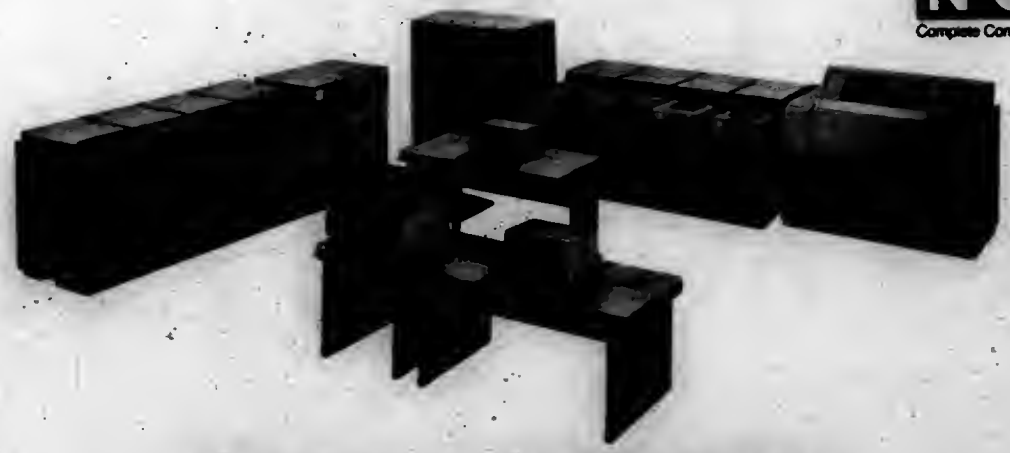

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# INTRODUCING DATA GENERAL'S NEW CS/10.

It has been gleefully estimated by all the industry pundits that during the next twelve months somewhere in the neighborhood of 500,000 small businessmen will purchase their very first computer.

Isn't it ironic that, until now, there was no computer perfectly suited to this emerging market? In fact, the choice narrowed down to computers that were either too much, or too little, or weren't capable of expanding to accommodate any but the most stagnant of businesses.

Which is precisely why we at Data General engineered the new CS/10. While the CS/10 is eminently affordable (actually it's the lowest priced—$10,950 list—serious multi-terminal computer in America and features one of the most aggressive discount policies for industry suppliers and volume purchasers), it is designed to provide a surprisingly wide range of sophisticated functions with enormous possibilities for expansion.

Its technical specifications? A master-control console with a powerful 16-bit microcomputer, a large easy-to-read display screen, an alphanumeric keyboard (with a wide range of keyboards and printers available as options), two integral diskette systems with up to 2.4 million bytes of on-line data storage (the CS/10 has the ability to be upgraded to Winchester-type technology and 50 million bytes of on-line data storage) and interactive COBOL (ANSI 1974, level I specifications with some level II features implemented) which, aside from being the most widely used programming language, is also among the easiest to use—even for a comparative neophyte.

But beyond these features—which, we'd like to remind you, is where few small computers ever go—the CS/10 truly excels.

It is expandable to a maximum of four interactive DASHER™ display terminals. Such innovative software tools as the Proxi™ program generator can be added to help you customize programming for practically peanuts and there's even an optional remote unit that enables you to diagnose problems from your desk or wherever you happen to be.

And perhaps the most significant competitive aspect of the CS/10 is that it isn't just one lonely machine. It is part of an entire family (CS/10 through 70) of program and data-compatible systems, which of course means that one modest CS/10 installation can easily burgeon into a 17-terminal CS/70 system (with an impressive number of peripherals).

And the software you develop for the CS/10 can be used in any further CS system you may grow into, up to the CS/70, so businesses needn't suffer undue financial hardships if they should become successful and grow.

If you'd care to know more about the new Data General CS/10—and, believe it or not, there's more to tell—simply fill out the coupon below and we'll be happy to inundate you with information.

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'An Outside Line? Dial One First . . . No, Get the Switchboard First . . . I Think a Three-Digit Code Is Required . . . Tap the Receiver Three Times, Then . . .'

# Mini Tracks Students

*(Continued from SR/22)*

sequence; factors considered in defining the priority sequence are number of available sections, length of each section, state code sequence and school-defined priority.

• The set of sections of a particular course is sorted into a priority sequence based on number of available seats and racial balance as a function of the race of the student being scheduled.

• Only courses defined in a master course table may be used. All input is interactive and no course may be entered that is not in the division course table.

• Each school has a separate set of files.

• Students may be transferred from one school to another by use of a student I.D.

• A personal data file is maintained on each student, including name, social security number, address, parent's name, telephone number, race, sex, level, birthdate, alert code and comments.

• Both global and local comments are allowed on the student's schedule card.

• Each homeroom teacher receives a class roll with appropriate personal data provided on each student.

• Each homeroom teacher receives a class roll that includes the personal data needed to prepare the attendance registers.

• A typical schedule for a school with 1,000 students can be run in less than 15 minutes. Therefore, guidance personnel can bring in corrections and watch the progress of the scheduling. If a change is required, it can be interactively made and the schedule rerun.

• A substitution table is set up by each school that tells the program the substitute courses that may be chosen in the event conflicts occur. This greatly reduces the work load by allowing the computer to make those decisions that would have been made by the guidance department.

• Force adds are permitted.

• Administrators have accurate data on school schedules months earlier than was previously possible.

• Administrators now have the freedom to ask "What if?", whereas before the use of computer scheduling, time was critical.

### Future Plans

The next step will be the interfacing of a newly acquired optical scanner into the system and the addition of other terminals.

The minicomputer is just becoming cost-effective for many of the nations' school divisions. This influx of technology into an area where change is slow has proved again that staff education must be considered one of the top priorities in the establishment of a successful DP program.

A final comment about what must be the primary objective. In education, any new idea must be evaluated with respect to one question: "Does it promote the welfare and education of the students we serve?"

The use of a computer can free counselors and administrators from mundane and time-consuming work. This precious time can then be used working directly with the students, giving them more comprehensive guidance and providing a more flexible school program, thus providing more value for each ever-dwindling educational dollar.

---

*Parker is a programmer with the Pittsylvania County School Board in Chatham, Va.*

There's never been a time
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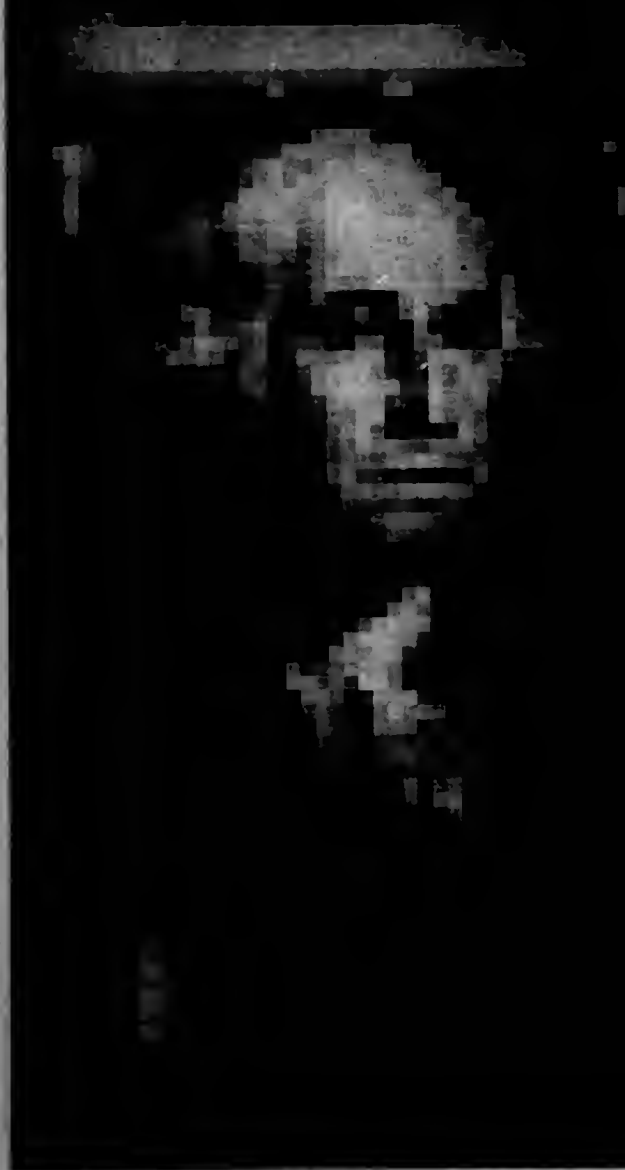

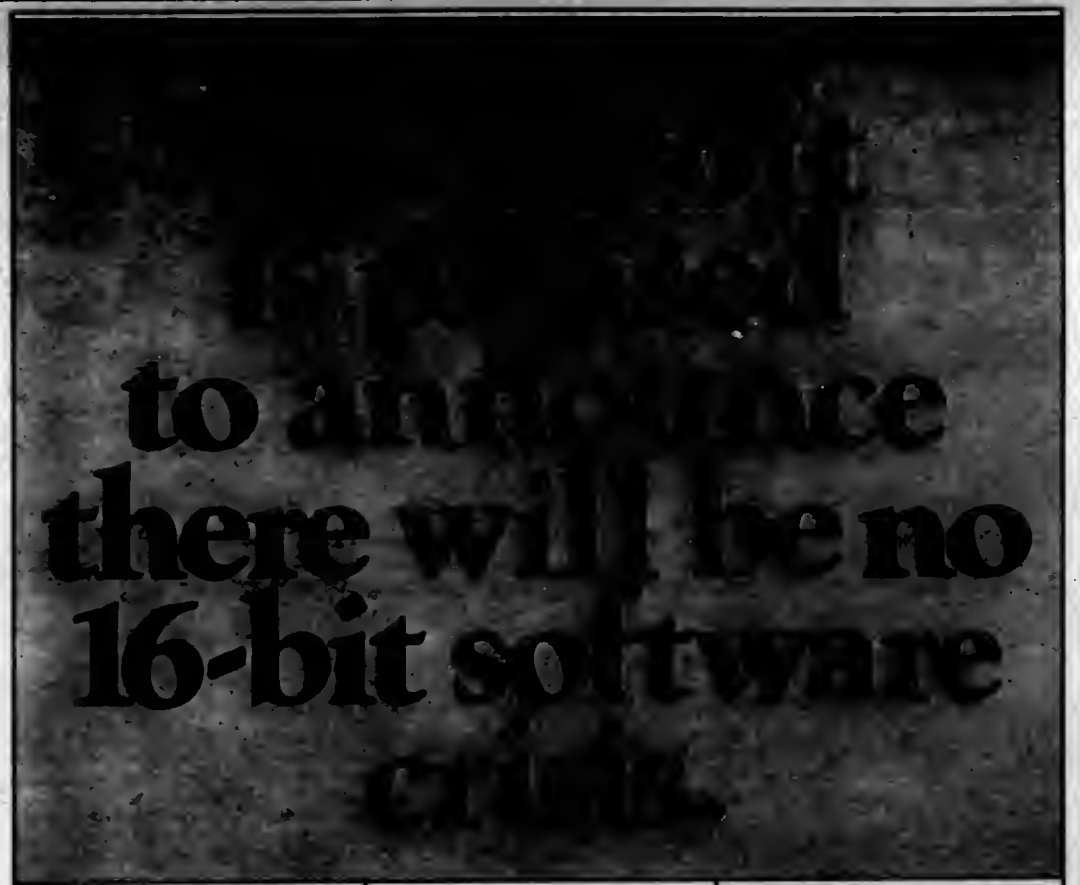


They didn't realize it at the time, but when Bell Laboratories developed the UNIX* Operating System they solved some mighty weighty problems for 16-bit software development. Now Microsoft is picking up where Bell left off and putting the UNIX Version 7 OS on the Intel 8086, Zilog Z8000 and Motorola 68000. (We've got the PDP-11† version too, at a very reasonable price.) We call it the XENIX™ operating system, pronounced "zeenix." Naturally, we are customizing and enhancing the XENIX OS to meet your needs, and we are providing complete support for every customer.

That's great news for the legions of UNIX OS fans, as well as for everyone getting into the 16-bit market. But even better news is that Microsoft can offer XENIX to OEMs at very competitive prices.

16-bit micros and the UNIX OS—that's a powerhouse combination, and only Microsoft has it.

## Finally, a state-of-the-art, standard OS.

As the biggest name in microcomputer system software, Microsoft will define the common ground to unite the next decade's microcomputer hardware.

And the XENIX operating system should make life a lot easier for everyone in the business. As the standard operating system, it will eliminate the crises that normally accompany emerging technology: the relearning and rewriting needed for each new machine. The software investments that become outdated the minute hardware diversifies. The wasted efforts.

The XENIX OS (written in the C programming language) will provide long sought-after hardware independence and portability, thus protecting software investments across hardware lines. Switching to a new microprocessor will be easy, since Microsoft will support them all.

## Honest-to-goodness UNIX OS. Only better.

The UNIX system well deserves the attention it's received in the past decade. It's a highly sophisticated, interactive, multi-user, multi-tasking system with extensive utilities and accompanying software packages—creating a total working environment. A standard environment.

Actually, the operating system itself is only a small part of the XENIX package. The vast system of utilities, developed over the last 10 years at Bell Laboratories, includes a C compiler, software development tools, function libraries, games, text formatting and typesetting programs, and much more.

And Microsoft's modifications and enhancements make the XENIX OS even more suitable for general commercial applications. XENIX software will fully utilize the powerful instruction sets and large addressing capability of the 16-bit microprocessors.

As with all Microsoft products, the XENIX system will be customized to your exact needs and specifications, then supported, maintained and updated every step of the way.

In addition, all of Microsoft's already-famous system software (including BASIC, COBOL, Pascal, DBMS), will run on the XENIX operating system. XENIX will also run all existing UNIX Version 7 OS software.

## A proven leader in worldwide software standards.

Microsoft's role as the leading supplier and authors of microcomputer system software has meant that we've established a number of standards throughout the industry.

That's why we're called a leader.

The establishment of a 16-bit standard operating system will be a big step forward for the industry.

With the introduction of the XENIX operating system, we're offering a superior standard system, plus the benefit of our extensive knowledge and expertise.

The XENIX operating system. The standard that ends the 16-bit software crisis. Before it's even begun.

*UNIX is a trademark of Bell Laboratories
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## At Lumber, Supply Firm

# Mini Helps User 'Weather' 200% Sales Increase

By Cynthia Casentini
Speical to CW

SALINAS, Calif. -- What does a small business do when it is faced with a 200% increase in gross sales, an accounting machine in its death throes and a service bureau gently nudging its clients to seek processing power elsewhere?

For the Hayward Lumber & Home Supply Co. here, the answer to these problems was found in a carefully designed growth plan mapped out with and including Datapoint Corp. minicomputers.

Hayward Lumber has five retail lumber and building material centers, a kitchen cabinet outlet, a prehung manufacturing center, and warehousing and land development divisions. The firm has been in business since 1919, with current gross revenues of about $21 million.

Previous planning had prepared management for an upgrade of its processing methods, which in 1976 consisted of an NCR Corp. 400 accounting machine, a leased IBM keypunch and the utilization of an IBM Systems/3 service bureau.

The decision to automate all accounting was hastened, however, by the reluctance of the service bureau to continue indefinitely the processing of Hayward's payroll and voluminous accounts receivable. A consultant firm's survey of the entire company operations yielded two recommendations: convert to a completely in-house DP department immediately with a Hewlett-Packard Co. HP 3000 installation, or make the conversion gradually with Datapoint equipment, which could include an interface with System/3 through specially formatted diskettes.

The second choice was considered more feasible because it would give management and the accounting department a chance to absorb the impact of automation more easily, was more desirable costwise and would permit the training of experienced employees rather than necessitate hiring a technical operations manager. The IBM service bureau agreed to assist in the gradual conversion process by making minor format changes to its existing programs.

A vendor specializing in Datapoint systems, Virginia Winn Software Co., was contracted for all systems design and customized software. Winn also provided staff training, in addition to the Datapoint customer education classes in which two employees participated.

### System Installed

The initial installation in December 1976, consisted of 16K processor, 5M bytes of disk storage, the diskette controller, three terminals and a small printer. This provided front-end accounts payable data entry to System/3, as well as accounting systems that remained resident on the Datapoint.

A major consideration in all programming was the establishment of good internal audit controls and system security, which had been recommended by the company's auditors.

Another priority was to keep the accounting centralized and to have as little impact on the branches' daily operations as possible.

The first installation proved so successful that more and more demands were forthcoming from users. An upgrade to a 48K processor with 40M bytes of disk storage, six terminals and a 600 line/min printer was made barely a year later.

This configuration allowed elimination of the keypunch because all data entry was now done through the Datapoint terminals. Processing costs were reduced at the service bureau when accounts payable and payroll came in-house.

The credit department gained flexibility with on-line account inquiry, and the conversion helped it absorb the impact of restrictive credit legislation. Many other accounting functions were augmented, including the development of a data base to support Lifo inventory valuation, which generated additional working capital from substantial tax savings.

### Time Demands

Because of the heavy time demands made on the newly formed DP department to accommodate the continued increase in sales and unit volume, the plans of operating totally in-house were accelerated. Housekeeping routines, including the formatting of the IBM diskettes for System/3, were taking up data entry time because the formatting could be done only when Datashare (dispersed data processing) was not operating. Program development for new systems was also having to wait its turn, and heavy overtime hours resulted.

A second stand-alone system was considered for processing and development, but it was at this time that Datapoint announced its Attached Resource Computer (ARC). By this combination of hardware and software, separate processors are dedicated to applications execution, disk I/O and the interchange between the two.

The ARC system would therefore support the data entry functions under Datashare and the processing of data or program development with all users having access to a common data base without conflict. ARC also allows almost unlimited growth because additional processors can be added to the system as needed.

### ARC Installation

ARC was installed in June 1979, with three 120K-byte processors, 80M bytes of disk storage and an additional terminal. No software changes were necessitated by either upgrade, and downtime for each installation was held to one day until the system was up and running.

By December 1979, all systems had been developed, and Hayward DP was operating totally in-house, with dependence on the outside service bureau terminated. Data entry is now available to the input clerks for eight hours daily. The entire system is down one hour for security backup, and the bulk of the end-of-day processing is run unattended at night utilizing a print spooler.

By making the conversion in relatively slow steps, and with top management providing input and support during each phase of implementation, the upgrade from the 1976 situation to the present-day operation has been easily absorbed in both cost and personnel factors. With a 50% increase in sales dollar volume since 1976, and a 24% increase in personnel companywide, the accounting department has added only one employee.

A DP committee has been formed, comprised of the chief executive officer, the controller, the assistant controller and the DP director. This committee is responsible for all systems design, the formation of both short- and long-range goals concerning data processing, and the effective communication between senior executives and the DP function.

*Casentini is the director of data proceseing at Hayward Lumber, based in Salinas, Calif.*

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# Security Audits Advisable

*(Continued from SR/26)*

as they move about, especially in cool, dry atmospheric conditions. The humidity of the air within the facility can be monitored and regulated using a large, wall-mounted gauge or meter and humidifiers and dehumidifiers in the air conditioning system.

In dry air, the potential for static discharges is great. If the relative humidity falls below 40% immediate protective measures must be taken — either humidifying the air supply or shutting the computer system down until conditions improve.

### Use of Mats

The only way to guarantee that static discharges will not damage electronic equipment or cause system malfunctions is to drain the static electricity away before it can be conducted or radiated to the equipment.

This requires that grounded conductive mats be placed around computer equipment and that employees be required to wear leather-soled shoes when working in the computer room. (Rubber-soled shoes insulate people from the grounding effect of the mats, thus defeating their purpose.)

These mats instantly drain away the static electricity that invritably builds up — to as much as 10,000 volts — with any kind of movement. The mats should be used even along paths close to equipment that is not usually touched. Static electricty strong enough to wipe out data or cause other system malfunctions can radiate from people to disks and processors as they walk past, without their being aware of the buildup.

### Power Surges

The normal voltage of ac power lines is approximately 120V, and much (but not all) computer equipment is designed to operate at this voltage (many devices use 220V).

All electrical supply systems are, however, subject to voltage anomalies called transients or surges. These are "spikes" in the voltage level — brief, unpredictable overvoltages up to 600V that, if not suppressed, can cause catastrophic damage to semiconductors and circuits.

Voltage transients are caused by circuit-switching in the utility grid supplying electricity to a region or locale, by the operation of electrical equipment (such as air conditioning units and elevators) within a building, by on and off switching on the feeder circuit and, of course, by lightning strikes on the main power line.

Transients powerful enough to alter data or parity can even be caused by flickering flourescent lights.

### Isolating Supply

The first line of protection against transients is to isolate the supply of electrical power to computer equipment from all other power supplies within the facility — those for office equipment, lighting, air conditioning and so forth.

Beyond that, to ensure that the computer equipment is protected, overvoltage protection devices should be installed in the circuits feeding the computer. A surge protector is not a voltage regulator; it cuts off the spikes in voltage, without raising the lows. But it is an inexpensive safety valve, if care is taken to choose one that has the proper specifications.

Unfortunately, many computer facilities are protected on a piecemeal basis, rather than by a comprehensive approach to safety and security. However, when applied intelligently as part of a well-developed set of procedures and precautions, the relatively small investment in protective equipment will be repaid many times over in the preservation of data and the safeguarding of equipment.

*Kenneth A. Eldred is president of Inmac Corp., which offers a variety of literature and equipment for the DP industry. The firm is currently offering a booklet entitled "The Computer Room," which contains guidelines and checklists for the design, construction and furnishing of computer facilities. Inmac is located at 2465 Augustine Drive, Santa Clara, Calif. 95051.*


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*When compared with the other products we evaluated, ACEP's response time is exceptionally good.*
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**A Food Processor**
*The response time is great and ACEP is a low overhead system. ACEP is easy to install, flexible and the service is unexceptional. Our Accounts Payable and Personnel Systems are driven through ACEP.*

**A Foreign Oil Company**
*We evaluated the competition and chose ACEP.*

**An Oil Company**
*ACEP supplies our remote users a time sharing capability under CICS/VS.*

**A Major New York Bank**
*ACEP is very powerful for the systems programmer.*
*Our service has been very responsive.*

**A Theater and Distribution Co.**
*We have installed and used three different systems. ACEP is the best I have ever worked with.*
*We have always been able to do exactly what we wanted. ACEP imposes no restrictions on us.*
*ACEP installs quickly and easily.*

**A Major Manufacturer**
*We spent many years looking for a system. We evaluated many products before choosing ACEP. It is one of the cleanest systems I have worked with.*
*I like the way ACEP controls authorization. System security is very good. ACEP has the best editing facilities of all packages available.*

**A Foreign Oil Company**
*We have multiple end users interacting with our Data Base Management System through ACEP.*

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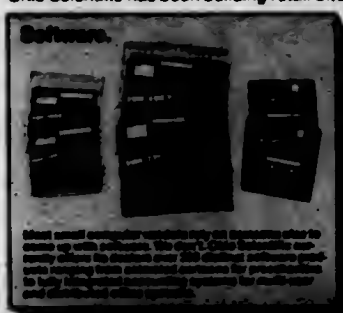


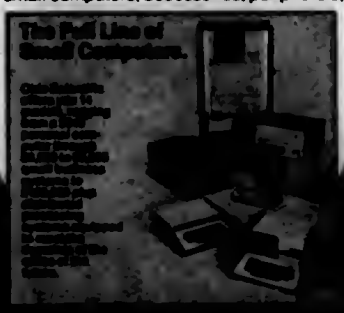


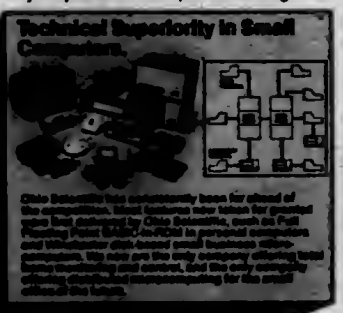

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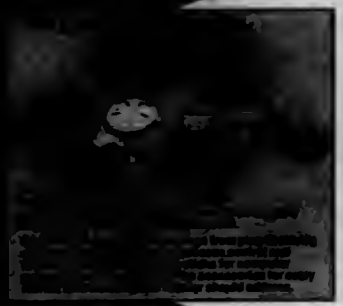

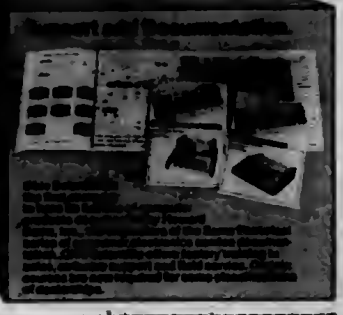


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# Consultants' MPU No 'Monument to Stupidity'

By Dave Osgood
Special to CW

BEDFORD, N.H. — In 1977, when Availability, Inc. personnel consultants first considered using a computer to retrieve applicants from our files, the last thing we wanted was an expensive monument to stupidity.

There were many positives and negatives that were weighed, time factors in the data entry to consider, costs and other priorities in our day-to-day operations.

We had spoken to an OEM representative, who had told us how we wanted our system and format, but being individuals and in a business we felt we knew better than he, we dismissed the idea. We wanted to do it our way or no way at all and once again, the cost factor came into being.

After much consideration and deliberation, we felt that "trying the water" instead of, "jumping in headfirst" would be the logical way to go. We started off with the McBee card sort system, which is basically punching DP cards and using an ice pick to sort through our files.

### Advantageous Venture?

Sounds simple enough, but when we had to start developing some sort of system to code our applicants, jobs and other categories, we started wondering if this venture would be to our advantage or disadvantage.

Many hours were spent among the three counselors in the office trying to come up with some standards we all could agree upon and that would be simple enough yet complete enough to be practical. We finally developed systems and breakdowns of disciplines; the hours were then put into the coding of applicants and punching of cards.

After three months of intense labor, we found this to be a worthy solution of retrieving applicants, but felt it was more work than it was worth, even though it was profitable! At that time, we felt we ought to again look into the possibility of totally computerizing our operation.

### Back to OEM

We went back to the OEM that had originally talked to us about a computerized system. After a year of his trying to develop and sell turnkey systems to personnel consulting firms, he had come to the conclusion that no two firms operate in the same manner and that in our business, we were all individuals, hence the need for custom-made systems.

At this point, the hours were just beginning for us, as this "new" computer system was so much advanced over the McBee manual card system. We had to develop our own data entry forms for information our secretary could easily recognize and enter. The next question arose as to whether to put only current applicants into the computer, or to update all the files that we had collected over a 10-year period.

We felt the only way to go was to update all files before entering them into our computer. Boy, what a mistake! Little did we know what we were getting into. The hours spent trying to locate applicants representing the past 10 years was more than we bargained for — hence, another idea out the window.

The only logical move at this point was to enter all applicants' records into the computer and the, as time permitted, update by sending a hard copy of the computer information we had, stating that we would appreciate some updated information.

This system has worked well, and we now have a very up-to-date data base of applicants. Those records we could not update have been destroyed.

### Valuable Asset

Our computer has become a very valuable asset to us, not only for keeping track of applicants and keeping an updated data base for our job orders, but also as a valuable sales tool in responding to companies' job listings. Companies seem impressed that we can take a job order on the phone and immediately search our computer to see if we have a "fit" for that position.

We have also had much success in having employers come to our office and do a search themselves for specific qualifications. One benefit with this system is that we can do a search and eliminate applicants who may presently work for that company, in order to ensure the confidentiality of our applicants.

The system that we currently have is a PDT 11/150, which is a user-programmable, intelligent data terminal consisting of a dual flexible-disk drive.

The unit contains a Digital Equipment Corp. LSI-11 microprocessor and is capable of communicating with up to six EIA-compatible serial line devices, which we have not yet had the need to install.

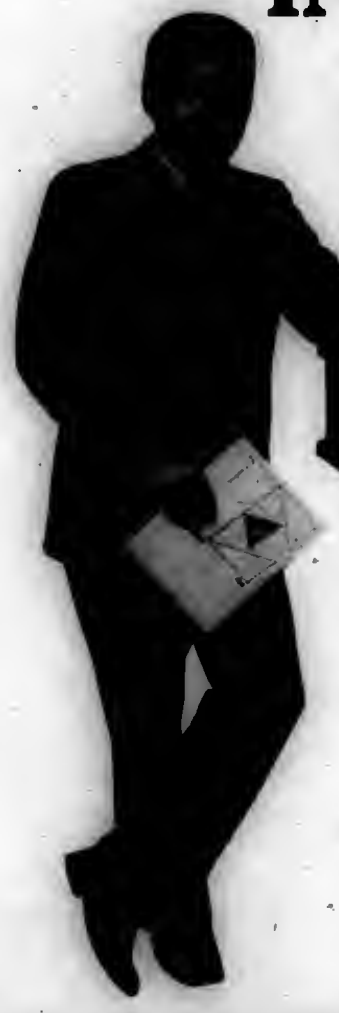
### WP Capability

The microcomputer operates with up to 60K bytes on two flexible disks. We also have a DEC VT100 CRT terminal and a Decwriter II. It also has the capabilities for word processing, which in the future we hope to employ.

For a staff of four counselors and two secretaries, it has been a real experience and a very worthwhile venture — one we definitely feel is not a "monument to our stupidity."

*Dave Osgood is president of Availability, Inc., located at 160 South River Road, Bedford, N.H. 03102.*


"WE SAVED
OR 5 TIMES THE
IN THE FIR



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*But All Too Common*

# Do-It-Yourself System Makes a Tough Project

By George Pitagorsky
And Robin Evans
Special to CW

This is a story of what is becoming an all-too-common experience in the world of small business computing.

As consultants specializing in computers for business, we come in contact with many people who have experienced loss of much time, effort and money in the attempt to install do-it-yourself computer systems.

Pat Oro (not his real name) is a seeker. He was looking for a computer system to use in his personnel businesses. He wanted to store and retrieve data on candidates, print resumes, print form letters and perform some basic accounting.

In addition, there was the idea that, with a little effort and money, a package could be developed and sold for fun and profit.

We came in contact with Pat of the Curtiss Group about two years after he had purchased his Imsai Manufacturing Corp. 8080 microcomputer. The Imsai had 64K bytes of random-access memory, two single-density disks and a Diablo Systems, Inc. word quality printer. Potentially, it was a powerful computing system. The cost was about $12,000.

Pat had wisely selected a microcomputer as the hardware for his system. The micro was the right size and had enough capacity to serve a business like the Curtiss Group. A mini would have cost too much to be useful; a mainframe via a timesharing service would not have given the people at Curtiss the independence and security they needed.

### Software Experts

Pat found a software expert referred to hereafter as R. Together they planned the system. R would do the software work and Pat would market the package.

R had some great ideas. First, he would modify the micro's operating system, which was Digital Research, Inc.'s CP/M. Then he'd get on to the 'trivial' task of doing the application work.

Unfortunately for Pat and R, R's approach to software development was characterized by minimal planning and documentation, haphazard controls and "seat of the pants" testing.

As the project got under way and problems began to arise, Pat's excitement turned to displeasure. His business required his full attention, and he devoted less and less time to the project.

R also began devoting less time to the project. He wasn't getting paid, so he began looking for more steady employment as it became clear that developing this personnel package was not as 'trivial' as it seemed.

After much hard work, Pat saw the task of developing custom software from scratch was very costly. It required full-time dedication as well as years of computer expertise — quite the opposite of the original goal of acquiring the computer for its time-saving and cost-effective business advantages.

### Complex Task

Many business people are misled by advertising that promotes smooth and easy, self-developing software. Purchasing a computer is a complex task. It is a purchase with which there will be a long-term relationship, and it should be acquired carefully, with a full understanding of computers, their applications and their capabilities — both in the short and long term.

By the time Pat called People and Solutions, Inc. (PAS), a consulting firm based here, the Imsai had been gathering dust for months. There was little documentation, several cryptically labeled disks containing the system and a nonworking Diablo Systems, Inc. printer.

At our first meeting, Pat shared his reasons for calling in a consultant. He explained that he wanted an objective view. The vendors he had contacted spoke 'computerese,' a language with which he was not fully familiar. Their demonstration and technical specifications did not allow him to see how their system would help his businesses.

In addition, the hardware from one manufacturer to another did not seem different. He did not know enough about computer software to have criteria with which to analyze and compare the systems. He realized he was relying on the advice of the computer vendors whose opinions were biased, of course, to sell their own systems.

### PAS Recommendations

In a short time PAS had analyzed the situation and reported that the Imsai could be made useful if Pat were willing to scrap the software work already done (especially the modifications to the operating system) and start over.

We estimated that custom programming of an information storage and retrieval system and use of existing word processing software would cost approximately $10,000.

PAS also interviewed a number of computer vendors, each selling a turnkey retrieval system designed for personnel firms.

*(Continued on SR/60)*


$75,000 -- PACKAGE COST-- ST YEAR!"

"With our small DP staff, it was not feasible to dedicate a programmer or analyst to an eight or 12-month development project. Furthermore, payables is a relatively standard application and we didn't want to 'reinvent the wheel'.

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## Data Entry Speeding

# As Retrieval Systems Evolve, Minis and

By Robert J. Campbell
Special to CW

In most computer and micrographics retrieval systems, about 80% of the data retrieval is accomplished with the computer and about 20% from the micrographics system. This lopsided ration brings up the question of justifying the cost of the microfilm program as part of a data processing system.

The fact of the matter is that the cost per picture element of storage is far less on microfilm than it is on disk or tape files, which is a good justification for adding microfilm capabilities to computers and minicomputers.

Although computer-assisted retrieval (CAR) can be configured on a large mainframe and run along with other tasks, the use of a free-standing minicomputer makes the system an independent entity. In large businesses that may have a large host computer, the dedicated minicomputer approach is often preferred.

The free-standing minicomputer with separate microimage terminals probably was the beginning of CAR. Initially, the configuration was off-line, with the operator simply looking up the data on the CRT terminal and, if documentation was needed, inserting the reel of microfilm into a microimage terminal and searching for the right document image. The minicomputer was used only to sort randomly entered data into an ordered index. Almost any micrographics retrieval method could be used with it, and it became simply an automated key to unlocking the microfilm files.

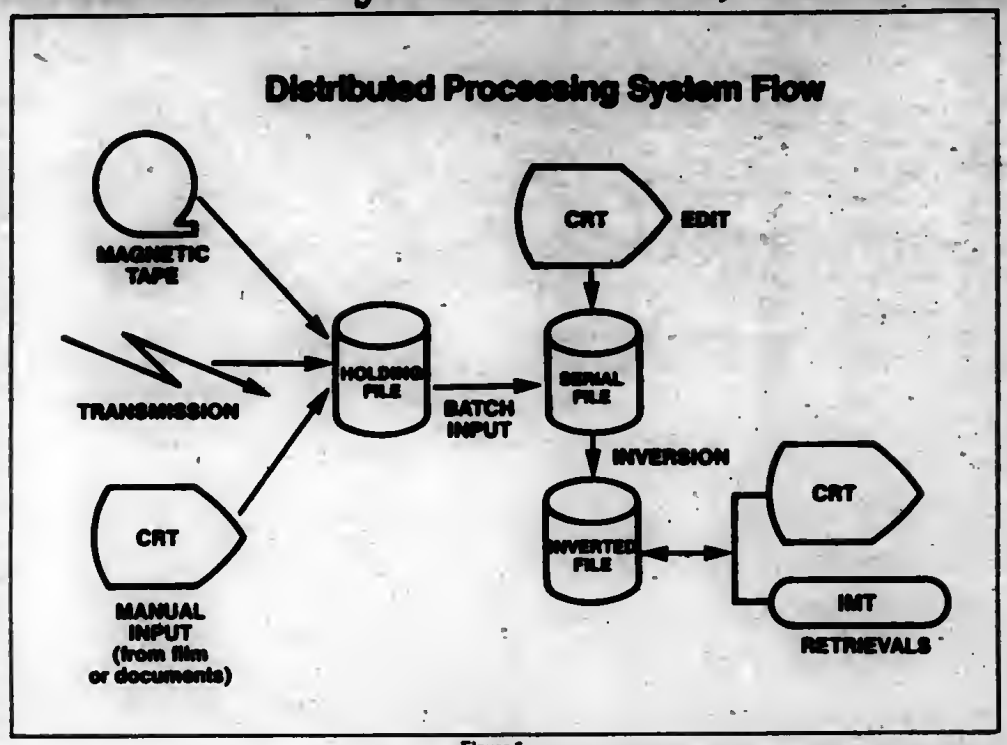


Figure 1

### On-Line to Mini

The next step was to put the microimage terminal on-line to the minicomputer. It worked the same as the original off-line system except that the mini could be used to drive the microimage terminal to the proper frame of film. The mini still was used simply as an index to the file. Even though the mini was not used to its fullest capacity, the file integrity and ability to retrieve documents much more rapidly was justification for the installation of the equipment for this application.

On-line use of the microimage terminals required either additional programming in the minicomputer or the addition of some machine intelligence to the microimage terminal to count image marks (or blips) as they passed an electric eye. Terminals such as the Kodak IMT microimage terminal were developed to satisfy this need.

The IMT microimage terminal is controlled by a programmable microcomputer which can "talk" with the host and also store up to 40 microfilm addresses that have been downloaded into its memory by the host. During retrieval, the operator simply inserts the

(Continued on SR/39)

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## *Up at Lower Cost*

# Microfilm Provide Efficient Storage

*(Continued from SR/38)*

appropriate microfilm magazine into the microimage terminal and lets it search and automatically display the desired film image.

The computer was used just as an electronic index for these applications. However, in some installations the computer does more. For example, at a midwestern police department, the CAR system consists of a minicomputer and a Kodak IMT microimage terminal. All arrest reports are microfilmed, then their contents are entered into the computer data base.

Researchers can extract information from the data base using a great variety of parameters, and the data base can also be sorted to prepare statistical reports automatically. Police administrators then can detect trends in crime patterns or recall several of the crime reports from the data base which fall into a *modus operandi*.

The summary data is stored in the minicomputer, while document images are on microfilm. The microfilm is referred to for details not available in the data base or when paper copies of the arrest reports are needed for other law enforcement agencies or insurance investigations.

This configuration represents more efficient use of the minicomputer's capabilities. In addition to serving as an index, the mini also massages data to reveal trends and prepare reports.

One facet of any free-standing CAR/minicomputer configuration is data entry. Even though the data can be entered at random, it still is key-entered through a data entry terminal by an operator, and this can be a slow process.

Distributed image processing, similar to distributed data processing, is speeding up data entry for CAR systems (Figure 1). Initially, distributed image processing used a minicomputer to orchestrate requests from the host computer into optimum retrieval schedules for microimage terminals (Figure 2). Thus, a few microimage terminals can serve the needs of a large number of CRT terminals.

### As Total Subsystems

New advancements in distributed image processing are using micrographics as total subsystems to the host computer system (Figure 3). In this case, all transaction data, including information regarding all documents and perhaps status data regarding the documentation, is entered into and handled by the host computer. This data then is transmitted on-line to the minicomputer, although it is not yet associated with any documentation.

The documents are microfilmed at random as a separate step, and this microfilm is delivered to a workstation consisting of a CRT terminal and a microimage terminal. Using the microfilm as source documents for data input, the operator matches up the document location with the data simply by calling up the proper data on the CRT terminal. The computer then automatically assigns the microfilm address and records it in memory.

In this case, the minicomputer serves both as an index for retrieval of the images and for data entry. However, only indexing data is entered through the mini. The bulk of the data entry, which used to slow the minicomputer system down so radically, now is accomplished at high speeds by the host. Because there is no paper movement, it is possible to attain input rates up to 1,000 or 1,500 documents per hour.

Some minicomputer/micrographics CAR systems being offered today are self-contained, with both minicomputers and micrographics terminal packaged as a unit. This usually limits the hardware and software capabilities of the overall systems. They were designed to fit the needs of a particular group of applications and often cannot be expanded to fit others.

Instead of limiting the capabilities of CAR systems in which we participate, we have chosen to be as flexible as possible by interfacing with others' minicomputers systems which can be tailored in size to meet almost any application. Also, we have chosen to work with flexible software packages.

One firm in particular, I.P. Sharp Associates, Inc., headquartered in Rochester, N.Y., has prepared several proprie-

*(Continued on SR/40)*

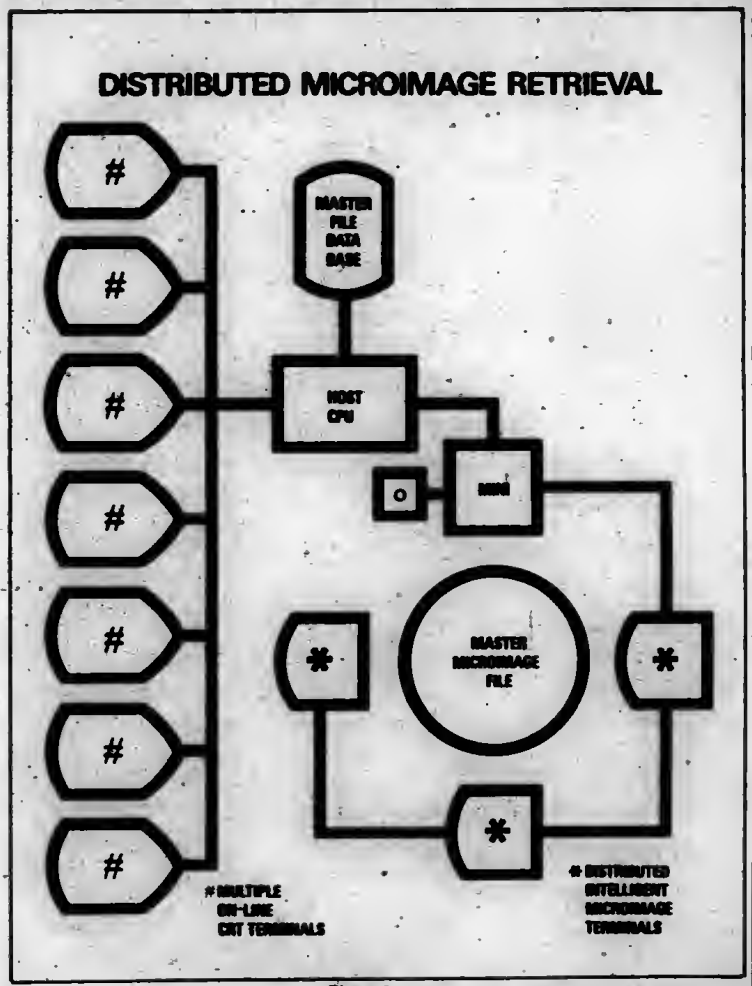


Figure 2

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# Minis, Microfilm Team for Efficient Storage

*(Continued from SR/39)*

tary software systems for use in CAR installations. Working with Data General Corp. hardware, Sharp can expand systems to meet current and anticipated needs and can tailor software to meet customers' specific needs. Its operation is highly flexible and is adaptable to a multimillion-document, public-utility file or a small-court records file of 500,000 documents or less.

### Systems Coordinator

In these installations, Kodak often is the systems coordinator and takes responsibility for them from the beginning. Although it is a multiple vendor situation, we have had no trouble with it. If any problems should arise, we feel it is in the best interest of all parties to resolve them quickly. This has been the case so far.

Minicomputers have existed with CAR since the beginning, even though CAR systems have become increasingly sophisticated. The reason is that minicomputers are available (at ever-decreasing prices) and programmable to suit the needs of the application. When minicomputers are combined with microfilm, the result is efficient, low-cost data stroage from which quick retrieval is available.

*Campbell has been with Eastman Kodak Co. since 1968, serving in a variety of positions. Currently, he is sales planning coordinator for micrographics, which includes management of sales programs for computer-assisted retrieval.*

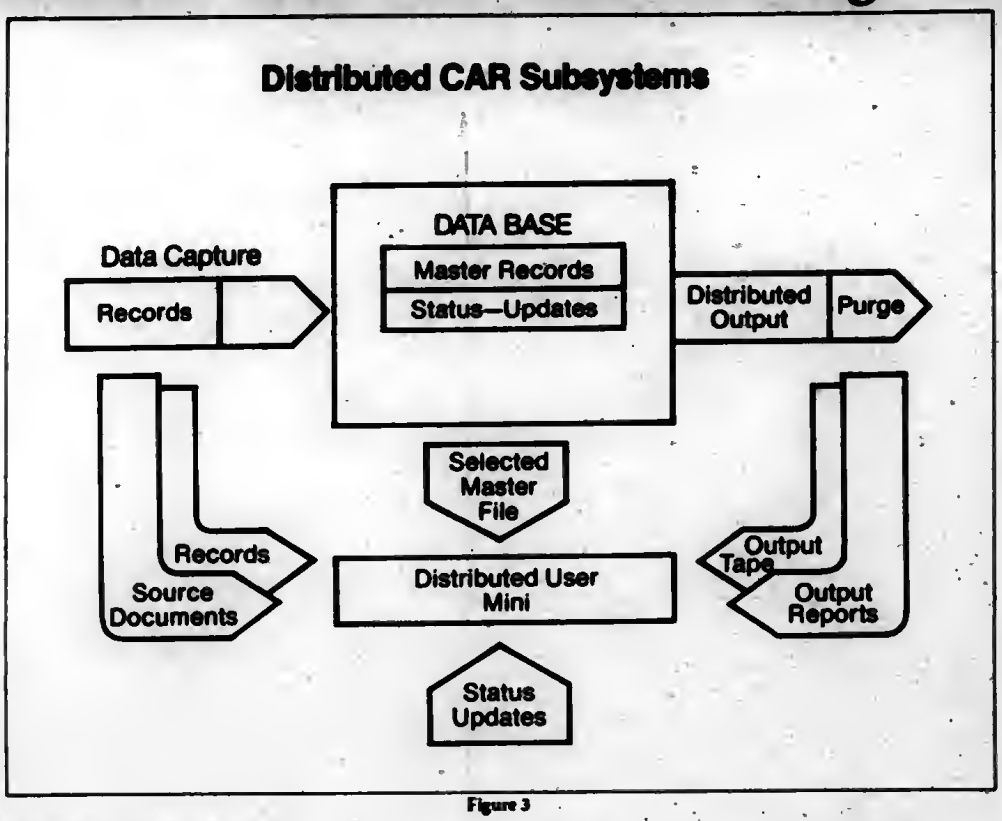


Figure 3

# Do-It-Yourself Systems Tough

*(Continued from SR/37)*

We told our client that for less than $20,000 he could acquire a turnkey personnel system that would serve his current needs and let him expand in the future.

We recommended that Pat acquire a hardware/software package using DEC PDP-11 computers. After seeing the system perform, he followed our recommendation.

### Lessons Learned

The lessons to be learned from this story are:

- Developing software on microcomputers requires at least as much skill as developing on mainframes, probably more skill because the available storage space is limited, hardware reliability is low and dealing with diskettes is unweidly.
- Developing a business applications system requires time, effort, planning and documentation, as well as programming.
- Saving money by buying a do-it-yourself computer usually costs more in the long run.
- Buying well-developed, field-proven systems from reputable vendors gets the best results — useful, effective computer systems.

In the course of the installation of the new system, Pat was able to see that DP professionals can objectively select the appropriate computer system, tailor a system to individual needs, train personnel and install a virtually error-free system.

*George Pitagorsky is president and Robin Evans is a staff consultant at People and Solutions, Inc., 159 Madison Ave., Suite 12c, New York, N.Y. 10016.*

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*To Make Work as 'Nice as Possible'*

# Physician Prescribes Small System for Office

Special to CW

FRAMINGHAM, Mass. — The first things a visitor to the offices of Pediatric Ophthalmic Associates Inc. here notices are the CRT terminals on the desks of the receptionists. After that, they see the toys in the office of the medical center's head, Dr. Richard J. Blocker.

"Our intent is to make this office as unmedical as possible, in terms of the children we treat," Blocker explained.

That kind of thinking — to make the medical office as enjoyable a place as possible — extends to Blocker's office staff as well. For that reason, he has a Data General Corp. microcomputer installed to make his operation more efficient, more accurate "and as nice as possible for the people who have to do the work," Blocker commented.

Blocker became aware of the possibilities of computers when he graduated from medical school in the late 1960s. "I never dreamed then that I'd eventually be able to afford one, since computers were expensive, bulky and complex." From his own experience, Blocker has since learned that computers are "relatively simple to operate, relatively trouble-free and don't need special environments."

### Cheaper, Simpler

Eventually, it was the dropping cost and user-complexity of computers, combined with rising amounts of paperwork, that drove Blocker to consider a computer. That led him directly to the one he runs now, a DG 64K-byte Micronova MP/200.

"Our paper load — private patient billing, insurance billing, patient scheduling and record-keeping — was becoming very difficult for the office staff to handle. We had three full-time people, plus one person half-time, and we were actively considering a fourth full-time person. Not only did we not have the space, but we thought it was a little ludicrous, since there were only two doctors in the practice.

"We surveyed the field to see if there was a system that could meet our needs and come in at a price no greater than the cost of another secretary," he said.

Blocker selected Micronova from W.S. Peck Computer Associates, Inc. of Cambridge, Mass., because he was convinced of the need for local support as well as a stable, nationwide hardware operation.

W.S. Peck also supplied the Medical Accounts Receivable System (Mars) software, which is a special application program written in Business Basic.

### Problem Quickly Solved

Although Blocker initially had a few problems with the system's operation, they were quickly ironed out.

"We had a questionable problem with one of the CRTs — it was arcing a lot, probably because of the static electricity conditions here. The service rep was here within three hours, replaced the tube and we've had no problems since."

*(Continued on SR/42)*

Patient scheduling and billing at Pediatric Ophthalmic Associates Inc. is done on a Data General Micronova MP/200 microcomputer. Television-like terminals with keyboards are used by the office staff to read information stored in the computer. Hard-copy printout is provided by the Dasher printer at left.


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# Small System Prescribed

*(Continued from SR/41)*

Although the skills he learned in his medical career, along with the advice of knowledgeable friends, helped him select a system, Blocker has nevertheless been surprised at some of the things he's seen and learned.

"As a result of getting the computer, not only didn't we have to hire the fourth person, but in fact we'll be reducing our office staff by one, so in essence the computer system is saving us two salaries," he noted.

Another surprise is the extent to which he has become involved in programming. "I'm on a learning curve right now. The amount you learn is exponential at the start. It's similar to my experience in medical school, or as an intern or a resident — there's so much to learn and read."

Blocker has constructed a computer terminal from a kit. Using the terminal in his home, he can access the DG computer in the office and get needed data about patients at any time of the day or night.

Although he has only had the system about six months, Blocker is already thinking about eventual upgrades. "We're looking towards the possibility of a paperless office, and as the price of memory comes down, it becomes more likely. That's one reason we're actively looking at upgrading our hardware to 256K-byte Nova 4X," he commented.

As part of that upgrade, Blocker plans to hook a letter-quality word printer to the computer. Such a move would enable him to lighten the burden now imposed by his correspondence and would also reduce such costs as copying and filing.

The doctor also plans eventually to gain access to some of the nationally available medical data bases. "There are a number of projects under way that provide diagnostic data bases, in which you input a list of symptoms and a list of possible diagnoses comes back, along with information about which tests would be most helpful in elucidating the diagnosis.

"We've toyed with the idea of someday setting up something like that ourselves on our computer — there are several books that already have the material in index form. You just load it into the computer and make it run that much faster."

The Data General Microneva MP/200 microcomputer with its 10M-byte memory storage disk is no bigger than a two-drawer file cabinet.

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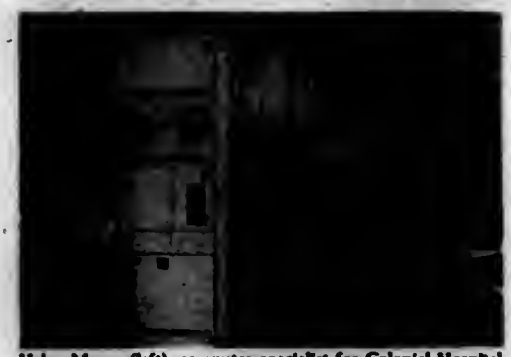
## *And Helps Keep Overhead Down*

# Voice Response System Boosts Supplier Orders

CHICAGO — If you're in a price-competitive business that operates with an average 3% profit after taxes, how do you keep your overhead down and your prices low to attract customers?

If you're Colonial Hospital Supply here, you keep your salespeople and customers talking — not to each other, but into a minicomputer-based, voice-activated order entry system.

As the price of health care products began to rise, hospitals and other customers became extremely price-conscious. That meant Colonial had to cut its selling and distribution expenses in order to improve profits. The distributor's investigation of cost reduction methods ended with the installation of the Touch-Talk Order Entry System (Toes).



Helen Mazur (left), computer specialist for Colonial Hospital Supply, is starting up the system.

Configured by Interface Technology, Inc. of St. Louis, Toes is made up of an IBM Series/1 minicomputer, a Votrax voice response system from Federal Screw Works, telephones and dial-up lines.

"Our customers and our salespeople enter their orders directly into our computer system using a 12-button Touch-Tone telephone or a Port-a-Tone keypad," Ben Welch, Colonial's treasurer, explained. "It normally takes less than 20 minutes to learn to use the system."

### Salespeople Benefit

Colonial's 22 salespeople now devote a good portion of their time in pursuing new business and improving their relationships with existing customers as well. Customers reacted favorably to the electronic order entry, resulting in their entering orders directly, Welch said. Consequently, salespeople have gained at least two hours of selling time per day.

With an estimated savings of 220 hours per week in selling time, better management of the use of this time will generate additional sales without any additions to existing sales personnel, Welch indicated.

Colonial's sales are up dramatically and should result in increasing revenues significantly, he added. Thirty customers who are using Toes have been ordering 50% more than they normally order. In one instance, during the fourth quarter of 1979, a particular customer ordered 85% more than he normally does.

### Faster Turnover

Colonial has found Toes effective in increasing inventory turnover. Because of the reduction in lead times to accept, process and deliver orders, the level of lead time usage of inventory automatically went down.

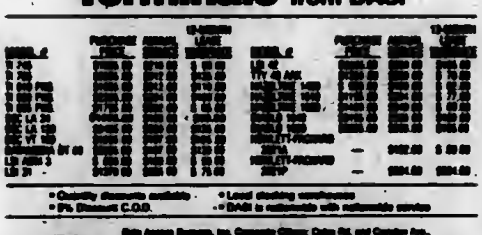
Combined with an increase in sales, the capital employed in accumulating inventory and the accompanying inventory carrying charges — which run at a rate of 22% of the value of inventory — were reduced substantially. For instance, for a particular level of sales, the average inventory was 2,136,000 when it should have been 2,400,000, based on previous inventory turnover ratio. Their inventory turnover increased from 7.1 to 10.1 and generated a net savings inclusive of interest

*(Continued on SR/44)*

When salesmen are on the road, they might not find a Touch-Tone telephone. This small Port-a-Tone terminal shown here converts any telephone into a Touch-Tone telephone.

Orders, after they are processed, are printed in the warehouse.


**Terminals from DASI**



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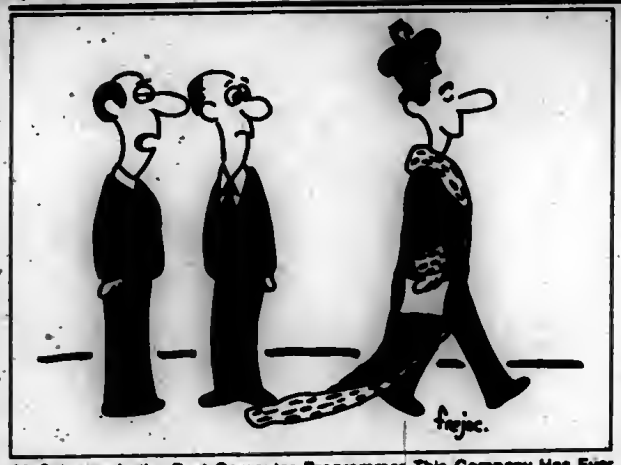


'McColeman is the Best Computer Programmer This Company Has Ever Had and He Knows It.'

# Voice-Activated System Boosts Supplier's Orders

*(Continued from SR/43)*

carrying charges of about $300,000, Welch said.

In addition to all the financial gains experienced by Colonial, one of the most important results of Toes, according to Welch, is improved work flow.

### Impact on Salespeople

Salespeople formerly went home at night and dictated their orders into a dictaphone. From 7:30 a.m. to 11:30 a.m. the next morning, these orders were typed up, which not only tied up administrative personnel, but also meant a delay in dispatching orders from the warehouse. By the time the orders were at the warehouse, it was well past noon.

Now, salespeople enter their orders directly into the minicomputer every night via the voice response system. The orders are automatically processed and dispatched to the warehouse at 7:30 in the morning.

### Order Verification

Every step of the order process is verified before going on to the next step, and the system detects the entry of invalid product codes.

If a particular item is out of stock, Toes lets the customer or salesperson know that and gives the opportunity to both salespeople and customers to cancel an item immediately and order a similar product from another manufacturer. Hence, customers placing their orders through Toes have their orders serviced hours, and many times days, before conventionally placed orders.

Colonial's initial objective was to collect 300 orders per month on Toes. Contrary to the firm's expectations, the orders placed by salespeople and customers totaled 700 the first month. Now, about 1,000 orders come in each month through Toes.

Prior to Toes' installation, anywhere from 19 to 25 hours a day were being spent on collecting and processing orders.

All of that time is now saved and is being utilized for other purposes -- representing an annual savings of $42,000.

"I could have easily relieved some of the people who were performing the order collection functions; however, our company policy is not to replace people with computers," Welch said. Hence, the time that previously went for order collection and processing is now being utilized by a company that Colonial started after the installation of Toes.


TI COBOL packages

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*A survey of electronic message systems*

# The EMS Revolution

By Raymond R. Panko

At Continental Bank in Chicago, mail is now delivered in seconds — anywhere in the world. More than 1,000 employees are linked by the bank's electronic message systems (EMS).

"They give us a real competitive advantage," said bank Vice-President Bob Champion. "I have people in Europe and the Far East and can communicate with them as easily as I can with people here in Chicago."

Continental Bank created its message system to enhance the productivity of its managers. Judging from the words of another vice-president, Bob Schiewe, the productivity goal is being reached: "I used to get six inches of paper in my 'in-box' every day. Now I get less than half an inch, and the things that come in by computer are easy and fast to handle.

"I have a lot more time to spend with my managers, a lot more time to do my real job."

To send a message in the Continental system, a manager has two choices: type it directly on a desktop terminal or delegate the typing to a secretary. In either case, the message is sent as soon as typing is finished. The next time the receiver checks his box, the message will be waiting. In fact, if the receiver's terminal has been left on, he will see the message immediately.

While the Continental Bank EMS is a large one, it is far from the largest. Texas Instruments, Inc., for example, has a worldwide EMS serving 8,000 terminals and handling more than four million messages each year. And Hewlett-Packard Co.'s internal EMS, while not placing any terminals on the desks of individual office workers, has even more impressive traffic statistics: more than 25 million messages are carried each year.

The message systems at Continental Bank, TI and HP are all in-house developments. But just about every major office products company is now offering or has announced plans for EMS:

- All of the major national computer networks in the U.S. and Canada already offer EMS. Tymnet's system is called OnTyme; Telenet's system is called Telemail; and Datapac's offering is called Envoy 100.
- Electronic message systems are also slated for the next generation of computer networks: Satellite Business Systems (SBS), the Xerox Telecommunications Network (Xten) and AT&T's Advanced Communications Service.
- Several time-sharing vendors and software houses offer fairly complete message systems that can be used via time-sharing, ordered as in-house software packages or purchased as in-house turnkey systems. A partial list includes the Computer Corp. of America; Infomedia Corp.; Scientific Time-Sharing Corp.; Bowne Information Systems, Inc.; DHL, Inc.; On-Line Software International; Anderson Jacobson, Inc.; Cybertek Computer Products, Inc.; Compuserv; SP Communications; and Rolm Corp. (which has a PBX-based message system).
- All of the major computer equipment vendors seem ready to offer EMS as part of the new "integrated" office systems now being designed and introduced. Tymshare, Inc., Datapoint Corp., Wang Laboratories, Inc., Prime Computer, Inc. and IBM already offer EMS in their integrated systems. Xerox has offered EMS in all experiments with its prototype integrated system, Alto. Digital Equipment Corp. originally eyed Computer Corp. of America's Comet system as a DEC offering, but has since decided to develop its own EMS program. Wang has even advertised its system on television.
- Potentially more important than all of these efforts is the work now under way worldwide to upgrade the international Telex service. The new service, teletex, now seems likely to be a relatively sophisticated EMS. The development of teletex is being done under the sponsorship of the Consultative Committee for International Telephone and Telegraph (CCITT), which is the chief international standards agency in telecommunications. Some countries notably West Germany and Sweden, plan to offer teletex by 1982 or 1983.

If teletex achieves its full promise, it could make a fairly sophisticated EMS available worldwide before the end of the decade.

### Electronic Mail

Many EMS vendors refer to their systems as "electronic mail" rather than EMS. Electronic mail certainly seems to be an apt name, since the messages are delivered electronically. However, the term "electronic mail" is already in use. In fact, electronic mail is already a $2 billion industry — with little help from EMS. Figure 1 shows an estimate for the electronic mail industry as it was in 1977.

**Estimated Electronic Mail Expenditures in the U.S.: 1977**
(millions of dollars)

| Category | | Annual Expenditures |
|---|---|---|
| Private teletypewriter networks | | $600-$1,200 |
| Western Union Telegraph Co. | | |
| Telex/TWX | $240 | |
| Mailgram | 50 | |
| Telegram | 60 | |
| Other | 50 | |
| Total | | $400 |
| Facsimile | | $200-$350 |
| Communicating Word Processors | | $40-$100 |
| Total | | $1,240-$1,850 |

Source: Reference1

Figure 1

There are two basic forms of electronic mail: teletypewriter systems and facsimile systems. Teletypewriter systems transmit messages as a string of characters, each character represented by a 7- to 10-bit code. The most common of these codes in the U.S. is Ascii.

Facsimile systems, in contrast, produce a picture of a page by scanning it, much as a television camera scans a scene or a copier scans a printed page. The scanned image is transmitted to a receiver, where it is printed. Facsimile systems are sometimes called telecopier systems.

Teletypewriter systems are desirable because they use much less transmission bandwidth than fascimile. Teletypewriter messages can also be stored in less memory space than facsimile messages. Facsimile, on the other hand, can transmit graphics, letterhead and signatures.

Both approaches can provide high-quality printing at the receiver's terminal. In practice, however, printing quality varies enormously in both approaches.

Electronic mail is dominated by "private teletypewriter networks" or PTNs (see Figure 1). In PTNs, a message is composed on the sender's teletypewriter. Early teletypewriters prepared messages on punched paper tapes; new terminals have electronic composition.

When the sender is ready, he dials the receiving terminal's code. A connection is established via the company's internal switching network, which typically uses common-carrier transmission lines but ties these lines together through the company's switches and concentrators. The receiver's terminal prints the incoming messages.

Some PTNs do not require that the sending and receiving teletypewriters be free at the same time; they provide "store-and-forward" service in which the sender's message is stored in the system until the receiver's terminal is free.

### Public Nets

Public teletypewriter networks are available in the U.S. primarily from the Western Union Telegraph Co. Although Western Union does not have a monopoly on teletypewriter services in the U.S. (ITT, in fact, plans to compete with Western Union), it offers nearly all public services in this country. Western Union's chief public service is Telex, a worldwide teletypewriter system. Western Union also offers quite a number of other services, including telegram service, Mailgram and Infocom.

*(Continued on In Depth/2)*

# IN DEPTH

*(Continued from In Depth/1)*

The U.S. Postal Service is attempting to enter the electronic mail market through its Electronic Computer-Originated Mail (Ecom) service. In many ways a Super-Mailgram service, Ecom would let companies such as bulk mailers send teletypewriter messages to local post offices, where they would be printed, then delivered by hand in the next day's mail.

Facsimile, although still fairly small in the overall picture, is growing very rapidly. Before 1970, the hostile interconnection regulations of the telephone system and antiquated technology limited facsimile to specialized applications, such as the transmission of newspaper photos. But when interconnection rules were liberalised, an opportunity emerged, and Xerox exploited it aggressively with new technology and heavy promotion.

Today, facsimile continues to grow rapidly, often at the expense of private teletypewriter networks.

The picture of facsimile should even brighten in the next two or three years. Both SBS and Xerox are encouraging the use of facsimile on their proposed national networks. Cheap bandwidth, coupled with technology to reduce transmission costs, is being held out to clients as a potent way to reduce their mail costs.

In addition, while facsimile interconnection is still far from standardized, several organizations are now providing transmission networks that are claimed to be capable of connecting most facsimile terminals to others. Existing networks -- Speed-Fax, Fax-Pac and Graphnet -- should grow in power and should be joined by others soon.

### Word Processors

Communicating word processors have added an important new dimension to work processing technology: the capability to distribute text after it is created. In early products it was necessary to handle text transfers manually. First, the sender called the receiver; then, they hooked up their systems.

Now, however, transmission work is becoming automated. Many units can work unattended. And IBM's 6670 Information Distributor can create a network linking word processors with one another and with printers scattered around the firm.

But there are problems ahead for communicating word processors. Although many are billed as compatible, most are compatible only in a limited sense: they can exchange streams of text. But when it comes to displaying text on a page or screen -- including margins, tabs, backspacing, underlining, fonts and so on -- there are no standards. Text that is "successfully" transmitted from one compatible system to another may produce only meaningless jumbles when the receiving system attempts to print it.

It should not be too long before different kinds of electronic mail melt together into hybrid delivery systems. With proper techniques, for instance, text produced from PTN terminals and communicating word processors already can be "printed" on a facsimile terminals. Already the OnTyme II service of Tymnet can send messages to facsimile terminals. Optical character recognition, in turn, will eventually be able to convert facsimile images into teletypewriter codes.

### Electronic Mail vs. EMS

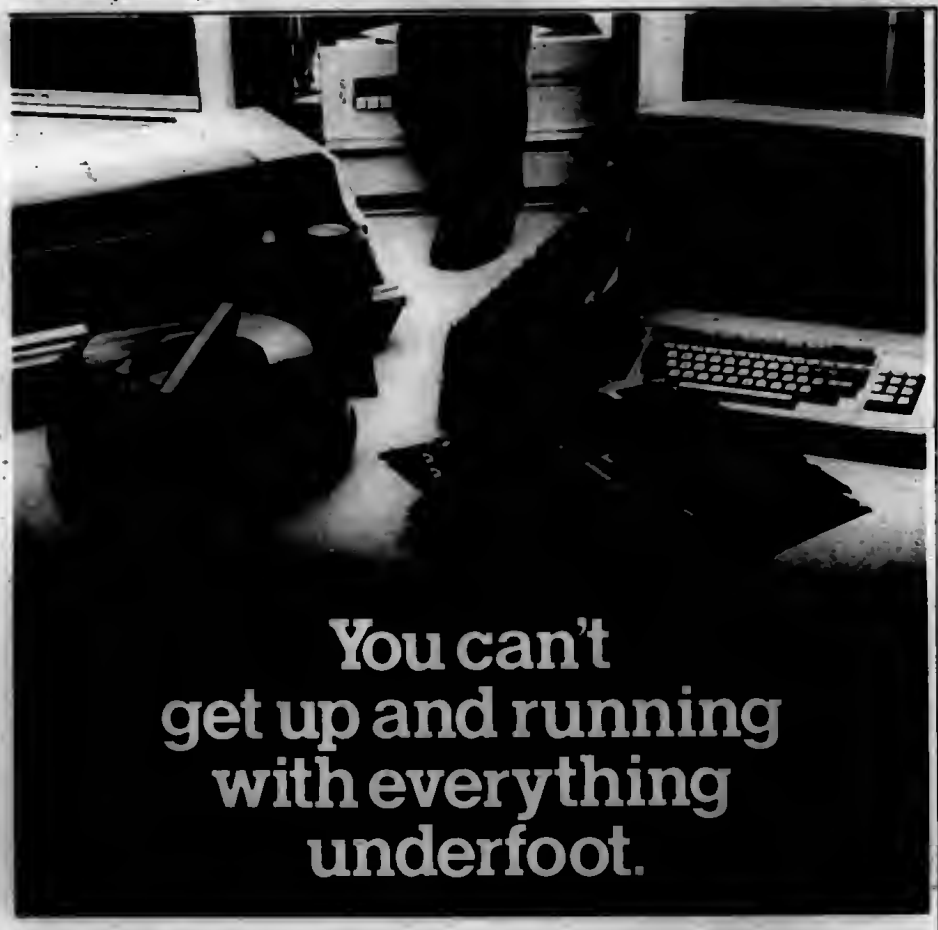
Electronic mail differs from EMS in this way:

- Electronic mail is concerned primarily with message *transmission*. It transmits a message from point A to point B, where it is printed.
- EMS, on the other hand, focuses on the *handling* of messages before and after transmission: research, drafting, editing, addressing, reading, filing, forwarding and so on. Related costs are very high.

There are other differences between electronic mail and EMS. Most notably, EMS terminals are usually placed on the desks of managers, professionals and secretaries. Furthermore EMS commands are tailored to general office workers and avoid the odd codes of Telex and many other teletypewriter systems. Electronic mail terminals, on the other hand, traditionally have been located in centralized communication centers staffed by trained operators.

This difference between EMS and electronic mail, of course, does not hold for convenience facsimile units.

Even the earliest time-sharing sys-

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tems had rudimentary electronic message systems[1], but these were generally primitive and required incredibly tolerant users. The real spurt in EMS did not begin until the Defense Department's Advanced Research Projects Agency Network (Arpanet) was made operational in 1972. The Arpanet, an early precursor to Telenet, Tymnet, ACS and Xten, linked research centers around the country. Computer scientists in these centers, who had long maintained informal ties with colleagues in distant locations, soon began to adapt local "mailbox" services to network delivery.

In this hothouse environment, EMS sophistication grew rapidly. A number of the Arpanet systems eventually reached commercial status, and many commercial EMS designs bear unmistakable evidence that Arpanet systems were studied.

But the "Arpanet origin" explanation for the recent surge in EMS is only partly attractive. A number of the current systems were designed in total ignorance of the Arpanet work. Tymnet's OnTyme, for instance, was fully operational before its design staff got its first view of Arpanet mail systems.

### Easy Design

Another explanation for EMS's current proliferation is based on the fact that EMS is inherently an easy design problem -- at least until some of the tougher design issues are faced. Continental Bank, for instance, had been writing programs since the earliest days of computers to handle the bank's huge transaction loads in checking and accounting. Gradually, over the years, automation affected even higher levels. "One day," according to bank Vice-President Tom Hannagan, "someone asked for a system to exchange messages. We looked at the problem, decided it wouldn't be too hard to do, so we did it. We had our pilot up after four man-months of effort." When asked why the bank had not implemented an EMS earlier, Hannagan remarked that it simply had not occured to anyone.

But this "easy problem" theory too has a weakness. If EMS is so easy, why wasn't it done earlier? To explain the timing of today's many simultaneous introductions, two other explanations seem to carry weight:

- First, many firms, like Continental Bank, have recently become concerned with office automation, and are increasingly focusing on systems for managers and professionals. Since managers and professionals both spend about 25% of their day reading and writing, the EMS application is a natural "next step" in many companies once word processing has been installed.
- Second, the costs of EMS have only just recently become attractive. In 1977, for instance, the Planet message system cost $1.48 per message, not including the cost of the terminal. But new technology has greatly reduced cost. At the Continental Bank, the cost per message in a system of similar power is already less than 50 cents.

In retrospect, these four factors -- the impact of Arpanet computer mail technology, the basic simplicity of plain EMS, rising user and vendor awareness of office automation and EMS, and falling costs -- are all combining to push electronic message systems out of the laboratory at great speed.

### User Reactions

Where EMS has been introduced, user reactions have been very favorable. In one recent survey of 210 EMS users in the U.S. Army Material Development and Readiness Command (Darcom), the author found that reactions to EMS were positive among managers, professionals and secretaries alike[2].

Even among those managers who eschewed terminal work and delegated use of the system to support workers, general reactions were highly favorable. In fact, only a handful of people surveyed actually disliked the system; the rest had positive reactions or were neutral.

The Darcom survey revealed that users had experienced a complex pattern of hard and soft benefits (see Figure 2). Nearly all experienced an increase in long-distance communications (a strong benefit in this geographically dispersed organization).

Beyond this, benefits varied considerably by the person's job and whether or not they used the terminal themselves. The only benefit widely disavowed was travel reduction.

In general, the pattern of benefits found was encouraging. EMS *did not* revolutionize the lives of managers, but it produced the kinds of steady gains that will probably mark all successful office automation technologies.

The Darcom survey also found that managers maintained strong discretion over how they used EMS. In traditional data processing systems, everyone had to use the system in exactly the same way. Clerical workers, since time immemorial, have been told what to do *and* how to do it. However, managers and professionals have traditionally been told only what to do, not how to do it, and they have tended to develop highly personalized ways of working.

In EMS, the first computer-based technology to be adopted widely by managers and professionals, this same pattern of idiosyncratic behavior is emerging.

*(Continued on In Depth/4)*

| | Percentages[b] | | | | | Significance Levels[c] | | |
|---|---|---|---|---|---|---|---|---|
| | Direct Users | | | Indirect | | Direct | Direct | N |
| | M[a] | P | M&P | S | N | M vs. P | M&P vs. S | D vs. I |
| Increased long-distance communication | 77% | 64% | 69% | 44% | 50% | .180 | .046 | .008 |
| Increased productivity | 74% | 50% | 60% | 35% | 35% | .245 | .002 | .004 |
| Decreased time on phone | 87% | 52% | 58% | 21% | 42% | .316 | .001 | .056 |
| Increased liking for job | 52% | 60% | 57% | 40% | 19% | .066 | .052 | .004 |
| Increased status | 52% | 48% | 49% | 35% | 24% | .399 | .054 | .006 |
| Increased effectiveness on travel | 48% | 49% | 48% | 10% | 26% | .423 | .001 | .012 |
| Decreased formality in communication | 44% | 42% | 43% | 14% | 40% | .289 | .008 | .476 |
| Decreased time reading & writing | 46% | 38% | 41% | 22% | 26% | .134 | .136 | .035 |
| Decreased time face-to-face | 39% | 26% | 39% | 12% | 29% | .016 | .001 | .007 |
| Increased flexibility of hours | 54% | 28% | 39% | 14% | 22% | .024 | .005 | .006 |
| Increased local communication | 15% | 22% | 19% | 10% | 2% | .474 | .051 | .006 |
| Decreased travel | 11% | 8% | 9% | 6% | 14% | .223 | .448 | .458 |

**Notes:**

a Direct vs. Indirect: Direct users work at the terminal themselves to send and receive messages; indirect users delegate terminal work to others.

b M, P and S: M=managers, P=professionals, S=secretaries

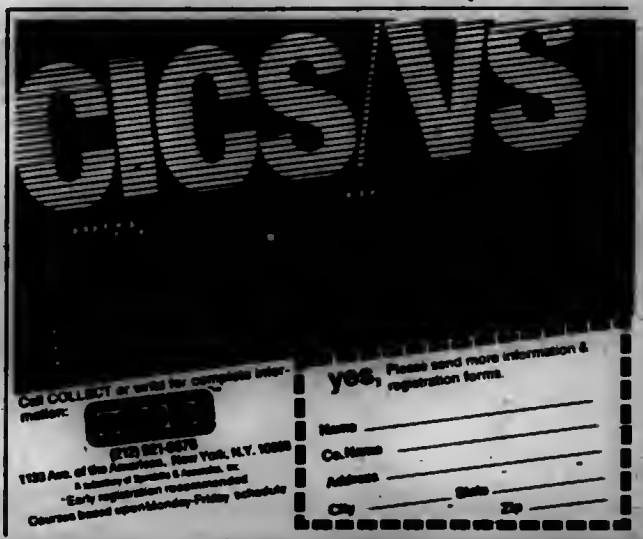
c The percentage shown is the percentage of respondents in this job category, say direct managers, that fit the row descriptor; on percentages do not add across or down columns.

d Significance tests are based on Kendall's Tau. The figure listed is alpha, that is, the probability that the null hypothesis (that there is no difference across job categories) is true. A single 1-tail inference is assumed. See the section entitled "The Survey" for caveats.

e Sample size for all job categories was 210.

Source: Reference 2.

**Figure 2. Experienced Benefits to Users by Job Category and Direct vs. Indirect Use[ab] -Percent Rating Benefit as Strongly or Moderately Felt**



# IN DEPTH

*(Continued from In Depth/3)*

Some users employ the full sophistication of the system, while others use only a few commands, and yet others delegate all terminal work to secretaries. The presence of light users and delegators bothers many programmers-designers, but a basic marketing reality is that nearly every consumer product has nonusers, light users and heavy users.

Managers and professionals who decide not to use the system heavily are usually neither lazy nor "computer naive." They are simply exercising their traditional responsibility to decide for themselves how to organize their work days.

One of the most promising things about EMS is that it does not appear to be a "hard sell." If care is taken so that the system works well when it is introduced, and if managers are given about one day of introductory training, a relatively high percentage will adopt even today's rather clumsy systems. It appears that EMS's ability to provide rapid message delivery that works even if the receivers cannot come to the telephone serves a real work need for managers and professionals.

On the Arpanet, a good deal of attention has been given to standardization, so that any EMS program on any machine can exchange messages with other message programs on the network. Even in this hothouse environment governed by a single agency, however, standardization is only partial.

At the simplest level of standardization, different message systems should be able to exchange messages as simple lines of text marked by beginning and ending signatures. This was the first level of standardization attempted on the Arpanet, and it was largely successful. Unfortunately, it was not enough.

Many people on the Arpanet began to get 10 or more messages a day, with gusts up to 50. At these traffic levels, users often demanded ways to scan through their in-boxes and call up old messages by author, date or title — just as managers now have to go through older correspondence and through material in their in-boxes. User complaints caused several basic "fields" to be standardized: to, from, subject and date, to begin with. This was not too difficult to standardize.

But correspondence is a more complex phenomenon than first appears, and soon many Arpanet systems began to rival the complexities of organizational paperwork. More than two dozen other fields were soon in common use. Despite massive efforts, the Arpanet community was never able to standardize more advanced aspects of EMS.

### A Distressing Fault

The Arpanet's inability to create a single standard for message structures is distressing because unless the user can operate on a message's structure, the biggest potential benefit of computer mail — its ability to automate some human message handling labor — will not be felt. Unless standards agencies can create comprehensive standards for message structure, EMS will become a lame medium for communication.

As difficult as simple text messages are to standardize, things are likely to grow even more difficult in the future as "multimedia" messages are created, combining voice, graphics, text, programs and perhaps even video communication. And even in the limited area of text, two factors will make standardization difficult:

- Many computer messages will be documents prepared on word processing systems. As noted earlier, while most communicating word processing systems can exchange character streams, their approaches to formatting text on a screen or page are deeply incompatible. In addition, many of the newer word processing systems will allow users to specify character fonts, making the screen formatting problem even harder.
- Long documents are extremely difficult to read on a screen. While roughly 70% of all messages will be less than one page in length, many will be longer, and the mean message length should be two to five pages. It is difficult to read large documents on a screen.

"Structured" documents, however, which allow readers to scan through the document quickly, for instance seeing only headings, have proven readable on a screen. But to date we have not even begun to see standards for structured documents.

### User Interface

A second area for standardization, after the basic message structure, is the user interface, that is, how the system appears to users. It is not entirely clear that it will be possible or even desirable to build a single user interface.

Such a standard might indeed be desirable, allowing users to move easily

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between systems. But as long as messages have known and standardized structures, many different user interfaces can be used to handle the message.

One approach to standardization would be to allow each user or organization to employ whatever interface it is most comfortable with, at the same time offering a standardized "lingua franca" interface for those who want to use it.

Even if there is standardization, there is likely to be a "product line" of user interfaces for users with different needs. At a minimum, there should be separate tools for delegators, simple users and sophisticated users. We may also need special interfaces for different jobs.

A third area for standardization is delivery. At a minimum, the system must be able to get the message from one user to another user's in-box, handling failures nicely when delivery is not possible. It might not be too difficult to design a standardized delivery system to do this.

### Complexities of Delivery

But delivery is inherently a very complex process as evidenced by our traditional delivery services, the postal and telephone systems. There may be levels of priority, levels of security, levels of reliability – each allowing the organization to match its needs with the lowest possible cost for delivery.

A fourth problem is how to interconnect address data bases, so that the formal address of an intended recipient can be located. Neither the postal system nor the telephone system has really provided universal "directory assistance"; the post office stops at the company mailroom in large firms, as does the telephone system's numbering in the directory. And neither traditional system provides universal listings. The telephone system, for instance, allows you to reach someone only if you know their approximate geographical location.

Complicating all of these standardization problems will be the fact that there is not likely to be a single EMS distribution network in the U.S. At least six national computer transmission networks will soon be operating, each with a national computer mail service. There also will be numerous smaller networks, run by time-sharing bureaus, individual corporations, special interest groups and even hobbyists. There will be no national control, in all probability, and standards must neither restrict what the big networks can do nor place burdens on small networks. Almost certainly, levels of delivery standards will be needed.

### Work Under Way

Some standardization efforts are already under way, but the very diversity and lack of coordination among existing efforts is itself disturbing. In all cases, only parts of the problem are being worked on, and many of the standardizing bodies seem unaware of the existence of others. Here is a list of some of the standardization work now under way:

- The teletex work of the CCITT is potentially the most important standardization activity in EMS. Unfortunately, most of the teletex working members have only a rather superficial view of EMS and seem unlikely even to face the kind of more advanced questions that must be answered if EMS is to achieve its real promise.
- Within the International Federation for Information Processing, Working Group 6.5 is devoted to EMS standards.
- In the U.S. defense research environment, the efforts of the Arpanet community to set standards for message systems provide a rich supply of information on the problems of standardization and on some possible approaches. A draft for a particularly advanced "next-generation" standard is now being widely circulated and discussed.
- Separate standards may develop in the area of business forms processing as a result of a major working group (ISO TC/154) on trade practices within the International Standards Organization. Since business forms make up about half of all business pages sent each year (see Figure 3 on In Depth/6), the development of separate standards in this area might be highly unfortunate.
- An effort is now under way to develop text formatting standards for

*(Continued on In Depth/6)*

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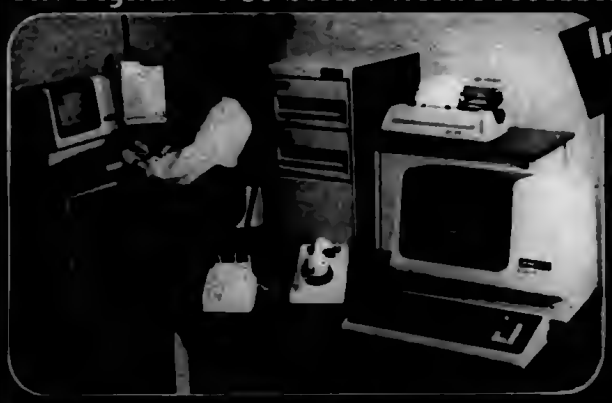

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|---|---|---|
| Intercompany | 12 | 32 |
| Intracompany | 22-44 | 160-800* |
| Intraoffice | 50-300* | |

* Very rough estimate

Source: References 6, 7

Figure 3. Estimated Written Communication Flows in the U.S.: 1977 (Billions of Pages)

*(Continued from In Depth/3)*

communicating word processors. As noted earlier, because the average message will be several pages long, formatting will be very important. This work is being conducted through the Ansi X4A12 committee, Working Group 4.

- The National Bureau of Standards is conducting a number of studies that could lead to EMS standards for the federal government.

Clearly, there is no shortage of efforts to bring standardization to EMS. Unfortunately, none of the groups now working on standardization appear to be taking a really creative and thorough view of what EMS may become in the future, and this lack of vision may not produce the best possible standards for the future.

Now that so many incompatible electronic message systems are in place, it is likely that no single standard will ever receive 100% acceptance. The question may be "How do we work together when more than one standard exists?"

One possibility is that just as computer networks now provide code conversion to allow different terminals and computers to interact, future services may be able to translate the protocols of incompatible systems. Perhaps the teletex standard will even be sufficiently powerful to serve as a least common denominator for such translations. (For a further discussion of standards, see Reference 5.)

### What About the FCC?

The specter of federal regulation has frightened many vendors and quite a few users too. But the regulatory watchword, at least in the U.S., is now "laissez faire."

In its final decision in the Second Computer Inquiry (Docket No. 20828), the Federal Communications Commission (FCC) recently divided all communication services into two categories: basic and enhanced. EMS falls into the enhanced category. While the FCC has retained the right to regulate enhanced services, it has decided not to do so, at least not in the foreseeable future.

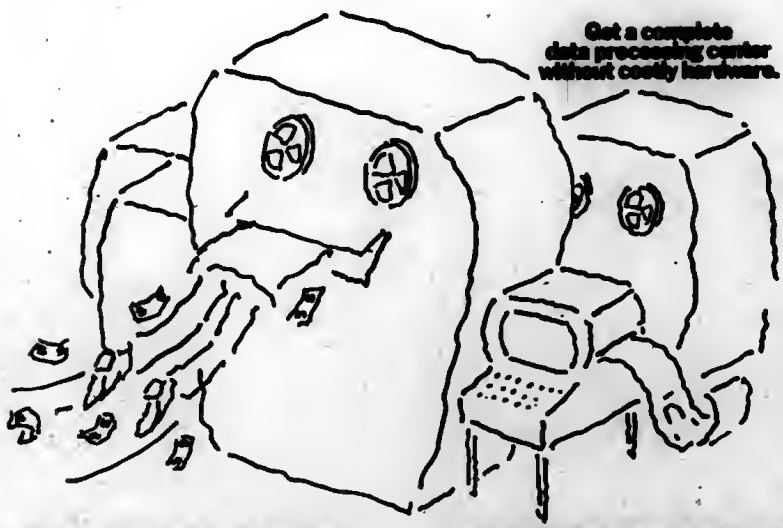
Even if the FCC eventually did decide to regulate EMS, this would only impact public EMS offerings. Intracompany message systems, which should dominate the industry, are almost certainly outside the FCC's realm of authority, just as private teletypewriter networks are today.

For messages going outside the U.S., however, the regulatory picture is very confused. The international record carriers (IRCs) that now handle message communication between the U.S. and the rest of the world are very jealous of their monopoly. Even more jealous of their monopolies are the postal, telephone and telegraph authorities (PTTs) that control domestic communication in almost all countries outside the U.S. and Canada. The rise of telex is likely to strengthen monopolistic trends.

Even companies that only want to send messages to their branch offices in other countries may face major obstacles. When HP established its internal, worldwide message network, for example, it had to negotiate separate arrangements with many different PTTs. Some allowed HP to use direct-dial lines; others required the use of more expensive data channels.

The sum total of the regulatory picture, however, will be very simple for most companies that want to use EMS; more precisely, the picture will be

*(Continued on In Depth/10)*

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# IN DEPTH

*(Continued from In Depth/6)*

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Computer mail's future seems secure. Costs, already low, are likely to fall 15% to 25% each year. By the mid-'80s, the cost per message should be competitive with *both* postal delivery and interoffice mail.

In fact, if the user is willing to live with message systems that handle little more than transmission, the cost of EMS is already below that of postage. Texas Instrument's very simple MSG system costs about 7 cents per delivered message, not including the cost of terminals (which are usually shared by several users).

Hardware for HP's Comsys mail system, sold commercially as the HP 2026, costs that company only about 5 cents per message including the cost of terminals.

As EMS costs fall ever closer to parity with traditional hand and postal delivery, we should see a revolution in the way businesses handle mail delivery.

As noted earlier, electronic mail is already a $2 billion industry, yet it has produced these revenues despite costs of 50 cents to $3 per message. Its total traffic is insignificant compared with the roughly one trillion pages of paper U.S. businesses and government agencies exchange each year (see Figure 3).

EMS's ability to produce delivery at electronic speeds and at postage stamp prices could expand the realm of electronic delivery vastly.

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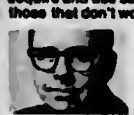

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It is, of course, hazardous to speculate about the future of any rapidly changing high-technology industry. At the same time, an earnest attempt has to be made to anticipate the future because the state of the art five years from now should be very different from today's.

### Some Predictions

Under these conditions, it seems appropriate to close this article with some guesses about what the future may bring:

1) *Refinement of Simple Systems.* As noted earlier, building a simple EMS is not vastly complex. Still, it is far from trivial, and most systems whose design begins with a clean sheet of paper end up being somewhat clumsy, flawed and imperfectly matched to user needs.

Until now, a majority of systems have been designed in isolation and in ignorance of both other design work and user reactions to other systems. It is hoped that designers will soon be forced by the marketplace to learn from their competitors in order to develop a differential advantage.

2) *Tackling the Next Tier of Problems.* With few exceptions, today's EMS networks work well only with small user communities. When systems grow beyond a few thousand users, the problems of finding a recipient's formal address becomes very difficult. How many Frank Johnsons are there in a large firm, anyway?

Another problem is missed or incomplete delivery. With telephone calls, it is easy to tell whether you have reached your party or at least someone with the authority to give him a message. In EMS, in contrast, the management required to handle "error conditions" is rarely present in any complete form. One user with little traffic leaves an important message onread for a week. Another has left the company without deactivating her mailbox. Another has gone on a three-week vacation.

The managerial work to handle such failures can become fairly large. While machine-based rules can help ("Notify me when the receiver has read the message"), many "solutions" are politically unacceptable.

In the relatively near future, text messages are likely to be carried over the same system as facsimile and perhaps voice messages. "Supercontrollers" already mix text, facsimile and voice. And with microprocessor control, a facsimile device can make a fine printer for text messages when not receiving facsimile. We are only beginning to understand the problems of integrating different forms of communication.

These three problem areas are only a few of the "next-tier" difficulties we can identify today. While the exact nature of the next generation of EMS is unclear, this much is obvious: tomorrow's message systems will be highly architectured and complex, not the relatively simple patches of today.

3) *Responses to Market Needs.* For

nearly all products, different customers have different needs and requirements. As a consequence, we usually divide the market into a number of segments with members whose needs are relatively similar.

In EMS to date, we have generally created fairly complex systems with one dozen to three dozen commands. Even systems that begin simply soon evolve into powerful systems.

But our survey of Darcom users, as noted earlier, revealed three fairly distinct user segments:

- Heavy users tend to use much of the EMS's full power. Generally they demand an ever-growing number of functions to make their terminal work more effective.
- Light users, in turn, rarely or never use advanced features. They read incoming messages, ignoring filing; and they type replies or new messages, ignoring all but the simplest editing.
- Delegators eschew terminal work, having their secretaries worry about how to use the system.

There has been a strong tendency among system designers in the past to view light users and delegators as being (1) naive, (2) recalcitrant and (3) disdainful of EMS. In fact, this is far from the case.

First, they are not naive. Many users become light users *after* considerable experience as heavy users.

Second, it is difficult to call someone recalcitrant if you cannot prove that he *should* work heavily at a terminal.

Third, the Darcom survey found that almost all users — heavy, light or delegators — liked the system very much; they just differed as to how to use it.

If there is any naivete around, it is on the part of system designers who expect everyone to use the system in the same way. In the realm of consumer products, as noted earlier, there are *nearly always* nonusers (or indirect users), light users and heavy users.

Obviously, we need a line of EMS products, not just a single product. Heavy users may demand rugged terminals and powerful interfaces. Light users may desire simple terminals if they are to be served economically, and they may need a system with few commands and options. Delegators should be able to dictate outgoing messages and have incoming messages printed for their secretaries to pick up.

*All* should have procedures for working closely with their secretaries, just as they do in paper correspondence. Obviously, all users should be able to exchange messages, and growth paths should be provided for lighter users. (See Reference 6 for more details on possible EMS product lines.)

By concentrating on heavy users, EMS designers have repeated the errors made in color television, microwave ovens and cameras. In those instances, designers began with expensive and highly adjustable products. But in short order, they realized that a large number of users wanted lower cost and more automatic (albeit less adjustable) systems.

In cameras, for instance, there used to be only two major categories: very cheap cameras (less than $50) and expensive complex 35mm SLRs costing about $500. Canon revolutionized this market when it introduced its lower cost, highly automatic 35mm SLR camera, the AE-1.

4) *Structured Communication Systems.* Few messages exist in isolation. Rather, they are usually generated in response to events or (more commonly) other messages. In turn, they turned to generate new messages. Communication, then, is not entirely free-from; it is usually at least partially structured.

In clerical offices, the structured nature of communication is particularly evident. A salesman phones in an order. A form is filled in sales, then forwarded to and added to in many offices — plant scheduling, inventory, credit, production operations, shipping and billing. This and other clerical processes have often been likened to paperwork assembly lines.

In administrative offices outside of the military (where communication structuring is intense, as discussed in Reference 8), the structuring is generally looser, but it exists nonetheless. There is structure in the way we put together end-of-the-month financial statements, manage projects, negotiate nurses' schedules, handle customer complaints and so on.

Very soon, we may see the emergence

*(Continued on In Depth/12)*

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# IN DEPTH

*(Continued from In Depth/11)*

of message systems that can work with organizational communication structuring. In computer conferencing, in work being done at the Wharton School and in the Military Message Experiment on Oahu, Hawaii, we are beginning to see experiments in this area. Working systems, we would hazard to guess, are still three to five years away.

*5) Voice Message Systems.* It has always been assumed that electronic message systems eventually would compete with or be joined to voice message systems (VMS).

In VMS, the sender does not type the message. Instead, he presses a special "message" key on the telephone, dials the receiver's number and speaks the message. A button lights on the receiver's phone. When the receiver presses his "listen" key, the message is played back.

This may seem rather antisocial, but voice messaging addresses the largest failing of the phone system today — that half or more of all telephone calls do not reach the intended receiver.

### Bitter Competitors

Some analysts believe that EMS and VMS will be bitter competitors. "EMS dominance" proponents argue that the written record of EMS and the ease of skimming through old messages will allow EMS to dominate. "VMS dominance" proponents, in turn, feel that the verbal nature of voice messaging make it a sure winner.

EMS costs are rapidly falling toward those of postal delivery and interoffice mail. The economic pressures to adopt EMS should soon be very strong in large corporations. Smaller firms too should soon converse over public message services.

EMS will not be a hard sell. As in any other office system, sloppy introduction can destroy enthusiasm very quickly. But EMS has consistently demonstrated the ability to have its terminals placed on the desks of many line managers and to be used by them enthusiastically.

However, companies should not lock themselves into any one system too tightly. EMS should evolve at a fierce pace throughout this decade. Several early vendors, like Wiltek, Inc., have already failed or have come very close to failure, falling behind the state of the art. But the outlook is bright, even though there are still a few clouds on the horizon.

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*Panko holds B.S. and M.B.A. degrees from Seattle University and a Ph.D from Stanford University.*

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Basically, the B920 employs a series of processor modules, each with its own memory. Each processor applies its resources to a specific system function, and additional processors can be added as the user's work load increases, a spokesman said.

The entry-level B920 features five processors. One processor provides operating control; another manages data files; two act as multiprogramming task processors, compiling and executing user applications; and the fifth processor handles data communications.

The five-processor B920 has 640K bytes of main memory, 44.6M bytes of disk storage space, a CRT terminal and a 300 line/min printer. However, total system memory can be expanded to 1.5M bytes by doubling each processor's memory capacity. Both processor and memory expansion require no additional programming, the spokesman explained.

Users have the option of installing up to three more task processors, or two task processors and one additional data communications processor for a total of eight modules.

The B920 computer offers a redundancy feature which allows users to continually process data and applications. Up to two of the system's task processors can be switched over to act as the file management processor and/or the system control processor. The particular feature is said to act as an instant backup for critical applications that require continuous system availability, the spokesman pointed out.

### Peripheral Subsystems

For users who want expanded systems, a wide range of peripheral subsystems can be linked to the B920. These subsystems include the firm's fixed drives, which offer capacities of 38.6M to 77.2M bytes, and removable disk drives, available in 4.6M-, 9.2M-, 65M- and 130M-byte capacities. Up to three disk drives can be used per system.

Additional peripheral subsystems include line printers with speeds ranging from 160 to 650 line/min, three types of minidisks and a phase-encoded magnetic tape subsystem, the spokesman noted.

On the software side, the B920 can be programmed in Cobol or RPG and has also been designed to function with the firm's Computer Management System (CMS) software, assuring program portability across the company's entire small business computer line, the spokesman claimed.

Software and application software programs for the B920 computer are separately licensed and priced, the spokesman noted.

Finally, to support data communications-oriented users, the B920's one or two data communications processors offer a maximum bandpass of 96,000 bit/sec. In addition, each communications line can be configured with the following characteristics: an asynchronous modem connect to 1,800 bit/sec, an asynchronous direct connect to 38,400 bit/sec, a synchronous/bysynchronous modem connect to 9,600 bit/sec and a BDLC modem connect to 9,600 bit/sec.

The basic five-processor B920 costs $60,500 or can be leased for $1,956/mo on a three-year lease. First customer deliveries are scheduled to begin during the third quarter of this year, the spokesman said from the company at 1 Burroughs Plaza, Detroit, Mich. 48232.

The B920 Small Business Computer

# Dataram Memory Module Adds 512K Bytes to VAX-11/780

CRANBURY, N.J. — A single-board add-in memory for Digital Equipment Corp. VAX-11/780 minicomputers that is said to offer twice the memory capacity of compatible DEC memory modules has been introduced by Dataram Corp.

The DR-178S has 512K bytes of memory arranged in 16K dynamic random access memory units and organized as 64K bytes by 72-bit words. The board's word length consists of two 32-bit words plus eight bits of error correcting code, a spokesman said. The device's timing is governed by DEC's M8213 memory controller in the host VAX-11/780.

The add-in memory has a typical access time of 250 nsec and a cycle time of 530 nsec, both clocked in a read mode, the spokesman added.

The price for the 512K-byte board is $5,660. However, a 256K-byte version is also available for $3,145 from the firm at Princeton-Hightstown Road, Cranbury, N.J. 08512.

# Printronix Unit Replaces 5256

MOBILE, Ala. — An intelligent controller that enables the Printronix, Inc. 150, 300, and 600 line/min printer/plotter to emulate the IBM 5256 printer on IBM's System/34 and System/38 computers has been introduced by Quality Micro Systems, Inc. (QMS).

The Magnum 3400 utilizes a dual microprocessor design consisting of two complete Motorola Semiconductor Corp. MC68-BOOL microcomputer systems on a single 9 by 12 circuit card, which fits inside the printer in its controller slot. The device contains not only the interface, but enhancement firmware which simplifies label printing and bar code generation, the vendor said.

### Added Features

In addition to the standard Printronix features, the enhanced firmware on the QMS controller generates variable size block letters from .1 in. to 10 in. upon instruction. Bar codes are generated by programs contained on the controller.

Other features include reverse imaging, mixed sizes on a line, variable aspect ratios, label repeat, double height characters, horizontal and vertical tabbing, line drawing set and picture capability.

The system is available in a printer-only version as well as a complete label-printing version. The price of the system, including printer and full label-printing capabilities, is $9,875 from QMS, P.O. Box 1644, Mobile, Ala. 36633.

# Subsystem Backs Tridensity Tape

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories has introduced a high-speed magnetic tape processor subsystem that reportedly supports 125 in./sec tridensity magnetic tape drives with speeds of 800, 1,600 or 6,250 bit/in. and recording in NRZI, PE and GCR formats.

Features include command chaining, data chaining and error correction. In addition, the unit offers auto tape loads, a tape density selection and up to four tape drives that can be supported by either the tridensity or dual-density subsystem, the vendor said.

The subsystem costs $14,500, the firm said from 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33313.

## *Acquiring a Mini — Part 2*

# Competitive Bidding Narrows Choice of Vendors

By Nander Brown Jr.
Special to CW

FALLS CHURCH, Va. — Besides targeting just one vendor or informally soliciting a select group of vendors from which to purchase a computer, the next and sometimes most practical method is competitive bidding.

Competitive bidding involves the preparation of a set of requirements that can be used by vendors to make a formal proposal. This requirement's document is called the request for proposal (RFP). The RFP is submitted to those vendors who are known suppliers of small business computers.

Other interested vendors should also be requested to bid on the proposal. Interested vendors will respond to the RFP by proposing a hardware/-software combination they feel will meet the requirements stated in the RFP.

*This is part 2 of a three-part series on buying a minicomputer.*

RFP is a formal invitation to bid. Invitations to bid should be invited from a representative number of sources. Prior to the preparation of the RFP, a survey should be made to establish a comprehensive list of sources from which to request bids.

### Proposal Information

The invitations should specifically instruct the vendors to include in their proposals at least the following items of information:

1. A proposal for a complete equipment system, including necessary or desirable peripheral equipment, itemized.

2. A description of each item of equipment, its capabilities and technical features.

3. Estimates of additional equipment required for indicated peak loads.

4. Detailed cost information regarding equipment, software, conversion, site preparation, maintenance and vendor support should be provided. Purchase price, rental price and available leasing arrangements should also be provided.

5. Programming assistance to be made available with and without charge.

6. Training support to be made under the contract and other training available for management, programmers and operators.

7. Specific maintenance service to be provided under the contract and other maintenance service available with cost.

8. Emergency substitute equipment availability.

9. Vendor service bureau locations and types of service available.

10. Locations of other similar installations.

11. Library resources available — applications, subroutines, compilers and so on.

12. Proposed delivery and installation schedule.

Once the proposals have been received and obvious missing items have been corrected, it is necessary to validate the proposals and determine what each vendor is offering relative to the identified requirements.

Validation involves ensuring that there are no errors and that the vendor's claims correspond with his ability to meet his promises and obligations. Validation also involves throughput analysis — a determination that the proposed alternatives meet the performance and major constraints identified in the requirements analysis phase.

Once the proposals have been validated, the plan and approach of each eligible vendor can be ranked according to defined criteria. The ability to meet the defined criteria must be set forth clearly. Each criterion can be ranked, according to its importance, and the criteria matrix, consisting of the weighted criteria and the vendor rankings for each, can be constructed.

### Final Selection

Final selection will then rest upon a check of references, visitations to present users and, perhaps, a benchmark test of the proposed system. Benchmarks need only be performed where terminal response or total system throughput capacity are critical. Throughput refers to the number of transactions that can be processed in a given period of time. This includes concurrent updating of master files and the generation of reports.

Listed below are some of the more critical aspects involved in hardware systems selection. It is felt that each of these should be carefully studied and weighed as to value and importance. The longer term implications should generally be of primary concern.

1. *Compliance with bid specifications.* Will the proposed system do the job as requested?

2. *Price-performance.* Given a specific application with specific volumes of work (10,000 accounts and 5,000 transactions), how does the cost of one system compare with another performing specific work?

3. *Capacity for increased demand.* At what point will another type or more computers be required, expressed in suitable values, such as number of accounts or transactions? Can bigger, more powerful models be used without reprogramming?

4. *Reliability.* What has the experience been with the various types of computers with respect to breakdown and repair time?

5. *Application programs, utility programs, diagnostic and special subroutines available.* Does the DP equipment manufacturer give the customer access to free programs which eliminate certain programming costs?

6. *Operating system features and overhead.* What will the use of an operating system mean in terms of increased operations and programmer efficiency? How much memory and what storage devices are required?

7. *Maintenance.* What is the maintenance cost?

8. *Ability to add memory, input/-output devices and features in the field.* What flexibility is built-in for expansion?

9. *Variety, speed and cost of input/-output devices available and programmed support for them.* Are they adequate?

10. *Delivery schedules.* How soon can the needed devices be installed? Will the equipment be ready to meet your schedule?

11. *Instruction repertoire and power.* How many instructions does the computer have? How do the functions performed compare with the functions provided on another computer?

12. *Device switching, multiprocessing, shared-file and other advanced capabilities.* If required, can input/output devices be switched between systems or channels? Can two systems communicate with each other? Is there a feature which allows input/output devices to be used by two or more systems?

13. *Physical requirements.* What are

(Continued on Page 60)

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## Tape Controller Fits PDP-11

TUSTIN, Calif. — The Western Peripherals Division of Wespercorp. has unveiled a tape controller for Digital Equipment Corp. PDP-11 computers that combines both phase-encoded (PE) and NRZ formats on a single printed circuit board.

The TC-131 universal magnetic tape controller plugs into a standard slot in the PDP-11 and can control up to eight nine-track NRZ, PE or dual-density tape units in any combination. All filtering is switch-selectable, and a built-in self-test LED monitor signals the operator when an error occurs, a spokesman stated.

The controller costs $3,300 from the firm at 14321 Myford Road, Tustin, Calif. 92680.

### With Winchester or SMD

# Disk System Speeds HEX-29 Response

OAKLAND, Calif. — The choice of a 14-in. Winchester drive or a Storage Module Device (SMD) has been added to the HEX-29 minicomputer by Digital Microsystems, Inc.

The HEX-29 disk system allows storage capacities up to 96M bytes and also improves the response time of the HEX-29 minicomputer, according to the vendor.

The Winchester drive comes in 14M bytes or 28M bytes and the SMD comes in 32-, 64-, or 96M-byte capacities including 16M bytes removable.

Housed in a rack-mount cabinet, the disk system comes complete with the HEX-29 computer, the intelligent controller, power supply and cables.

The controller for the SMD can control a number of disk drives from 32M bytes to 96M bytes, the firm said. The channel processor executes a high level set of commands and can operate concurrent with full speed execution of the CPU, the firm noted. Error detection and correction techniques assure long-term data integrity.

The controller for the Winchester drive includes error-correction hardware that will detect almost any error up to a 6-bit error burst. The intelligent controller with its 32K bytes of buffer storage can be microprogrammed to perform much of the file access overhead and reduce the computational load on the computer.

The system ranges in price from $21,000 to $30,000, depending on the configuration. Digital Microsystems is at 4448 Piedmont Ave., Oakland, Calif. 94611.

# Competitive Bids Aid Users

*(Continued from Page 58)*

the physical requirements for the computing system, such as power, floor space, air conditioning and floor loading?

14. *"Free" testing arrangements.* Does the manufacturer provide testing centers for the use of customers, or permit the system to be used at no charge for a period of time?

15. *Availability of back-up equipment.* What alternatives can be taken when the computer breaks down? Are there similar computers nearby?

16. *Guarantee or warranty.* How long is it and what is covered?

On the less technical side, the points below may be equally as important in selecting hardware systems:

1. Availability of educational support from the vendor.

2. Systems and programming assistance.

3. Conversion assistance.

4. Creditability of the vendor: vendor's financial status; vendor's overall experience with computers; vendor's experience in your particular field.

Next week, Brown discusses contracts and the basic rules of implementation.

*Brown is regional audit manager for the Washington, D.C., area office of EDP Audit Controls, Inc., an Oakland, Calif.-based audit firm. He has previously served as audit manager for the U.S. Department of the Interior and the Cincinnati region of the General Accounting Office. He has also consulted for the aerospace, insurance and banking industries as well as for several municipal governments.*


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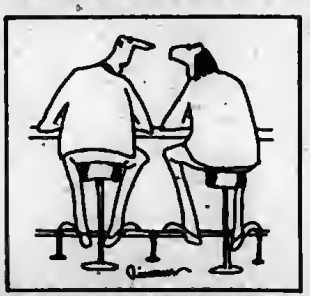

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# *New Name, New Markets For CMI*

By Rita Shaw
CW Staff

WALTHAM, Mass. — The name change from Cambridge Memories, Inc. (CMI) to Cambex Corp. — announced in conjunction with the vendor's introduction of processors to compete with the high end of IBM's 4300 series and its 370/158 Model 3 [CW, Aug. 18] — is not the only upheaval taking place within the 10-year-old firm.

"We have changed our name to reflect our expanding products and markets," Cambex President Joseph Kruy said. In addition to its traditional business in memory systems, Cambex is now manufacturing IBM plug-compatible mainframe processors to sell into the mid-range computer market, he continued.

The past year was characterized by Kruy as "one of transition" with the firm involved in the conversion from being a memory supplier to functioning as a combined memory and mainframe manufacturer.

Cambex — then CMI — sold back its 40% interest in IPL Systems, Inc. for an estimated $4 million just a few months ago, Kruy said. In addition to the cash, Cambex acquired worldwide manufacturing rights to the IPL computer architecture and technology, he said.

IPL currently manufactures the Omega series computers being marketed by Control Data Corp. And, this architecture and systems technology is the basis for the newly announced Cambex 1600 series, he said.

### Initial Efforts

CMI's efforts to expand into the mainframe market actually began with the announcement of IBM plug-compatible processors approximately two years ago [CW, Aug. 28, 1978]. Designated the Model 1, 2 and 3, these mainframes were offered as alternatives to the 370/115, 125 and 135.

IBM's E series announcement caused CMI to reassess its marketing strategy, Peter Weill, vice-president of international Operations, explained. The result of this evaluation caused the vendor to drop the two low-end models, which had been redesignated the 1618 and 1628, respectively, he said.

The 4300 series was larger and more price-competitive than IBM plug-compatible manufacturers (PCM) had expected, Weill noted. CMI reacted by concentrating its efforts on the previously

*(Continued on Page 64)*

# Burroughs Seeks to Buy SDC for $98 Million

By Marcia Blumenthal
CW Staff

DETROIT — Burroughs Corp. has reached an agreement in principle to acquire System Development Corp. (SDC) for $98 million.

While Burroughs declined to comment on the reason for the proposed acquisition of the 3,816-employee software and services firm, sources noted Burrough is aiming to improve its competitive position in the sale of special-purpose systems to the federal government. Nearly 70% of SDC's estimated $168 million in revenues is derived from contracts with the Department of Defense and other agencies, an SDC spokeswoman said.

Five or 10 years ago, Burroughs was a strong competitor in the government market. In recent years, however, it has lost ground to Univac and Honeywell, Inc., according to an informed source.

Currently the Detroit mainframer is locking horns with Univac for a contract known as Phase Four, to automate U.S. Air Force bases. At stake in the contract, which has reportedly been highly political and messy, is the replacement of 120 Burroughs 3800s and 150 Univac 1050s, Fredrick Withington, a vice-president with Arthur D. Little, Inc., said.

In the past, SDC and Burroughs worked together developing a system for the U.S. Army's Weapons Laboratory. SDC created the computer architecture — Parallel Element Processing Ensemble — while Burroughs built the special fabrication "supercomputer" for the system, a source stated.

### Service Business

Moreover, the privately held SDC has a substantial data processing service business. Burroughs has said it will place more emphasis on services in the future, a source observed, and is likely to use SDC's capability to achieve that goal.

SDC offers its users two commercial products — SDC Search, an on-line bibliographic information retrieval system, and a Cash Administration System for various medical claims. In addition, the company operates a 1,478-person facilities management operation for government agencies such as the National Aeronautics and Space Administration and the U.S. Navy.

Within the past two years, SDC has also established a Products Group. This group is in the process of developing a new type of architecture for a records management system, the spokeswoman said. Products developed for the office automation segment would fit in nicely with Burroughs commitment to that marketplace.

Burroughs recently consolidated its management, manufacturing, marketing and service operations for its Graphic Sciences and Redactron subsidiaries — both acquisitions — into its Office Automation Division [CW, April 14].

Under the terms of the proposed aquisition, SDC shareholders would receive $69 per share, and the company would become a wholly owned subsidiary of Burroughs, retaining its present management, the spokeswoman said.

Although on the surface the price of the acquisition relative to SDC's revenues appears low, the firm's profits are probably low as government contracts are not highly lucrative, one observer commented.

Two-thirds of SDC's stock is owned by the

*(Continued on Page 64)*

# HP Forms Branch For Business Gear

PALO ALTO, Calif. — Hewlett-Packard Co. has formed a new group, the Business Computer Group, which is part of the Computer Products Group. The new group is made up of four products divisions — the Computer Systems Division, the Information Systems Division, the General Systems Division and two international organizations.

The recently formed Computer Systems Division has responsibility for the HP 3000.

Also a newly created division, the Information Systems Division is the first division devoted primarily to software. In addition to developing software tools such as commercial languages and data base management systems, this division, headed by Mathias E. Schmutz, will be responsible for the HP 300, small business system.

The third unit of the new group is the General Systems Division, which oversees the HP 250 small business product line as well as the ongoing development of small systems for the business market. L. William Krause will head this division.

The two international organizations coming under the new division are the Boeblingen General Systems Division and the commercial systems operation in Pinewood, England, both providing software and support for HP's computer systems in major international markets.

Named as general manager of the Business Computer Group is Edward R. McCracken. Milton Liebhaber has been appointed marketing manager for the group.

Aside from the Business Computer Group, HP's Computer Group also includes the Technical Computer Group, the Computer Peripherals Group, the Data Terminals Division and the Computer Marketing Group.

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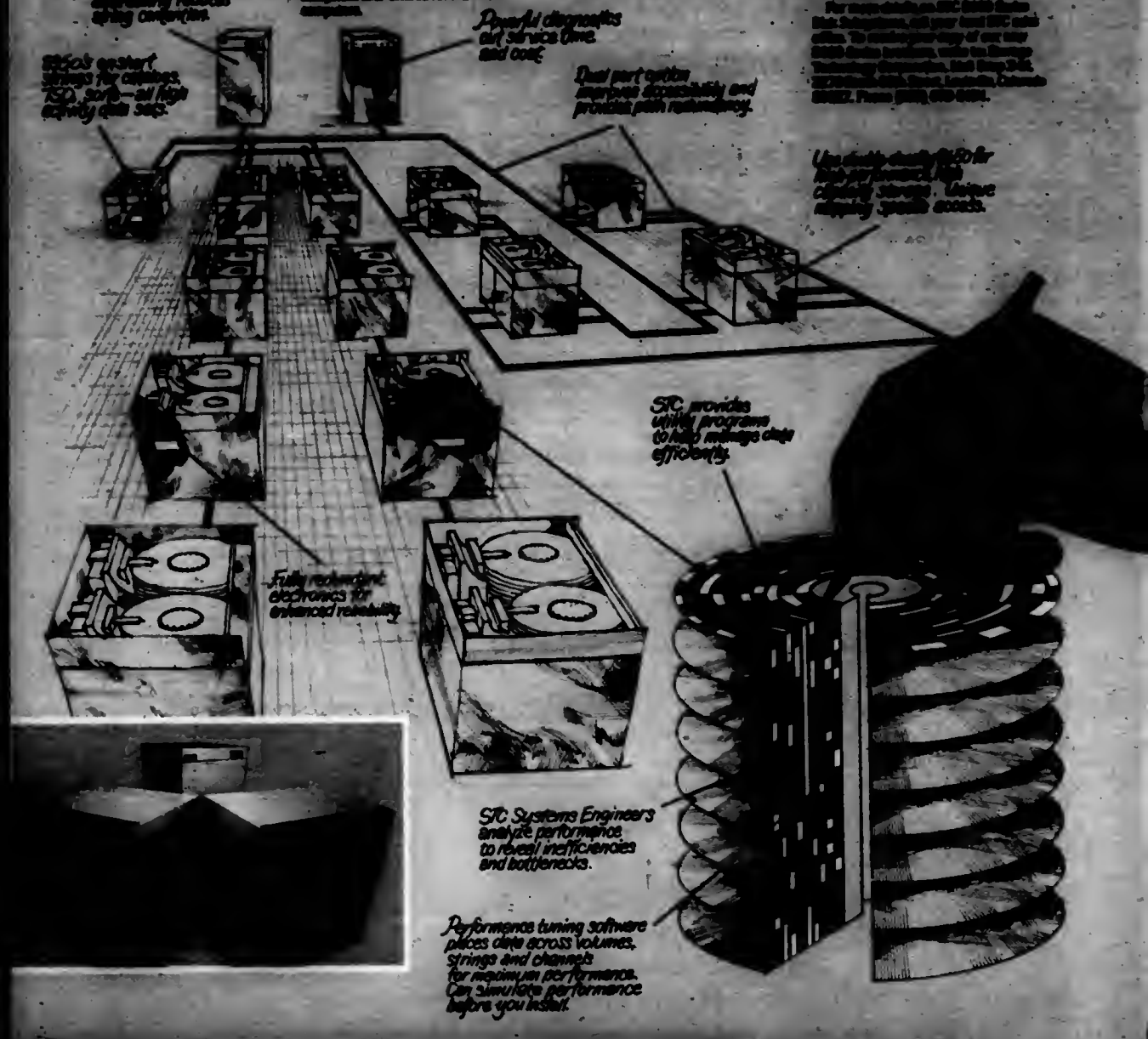
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# USTR Seeking Data on Transborder Barriers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Trade Representative's Office (USTR) is compiling information on barriers to international trade in information, data processing and telecommunications services.

The agency is trying to identify specific examples of nontariff barriers to this type of trade, including national laws, procurement policies, technical standards "or any other policies or practices adopted by foreign governments or industries."

The USTR, a White House office charged with negotiating and administering international trade agreements, is seeking the information to develop a framework for future international discussions on services trade, according to Nancy Adams, chairwoman of the USTR Interagency Services Subcommittee.

### Preliminary Study

The subcommittee hopes to have a preliminary study published by the end of September as part of its work in identifying barriers to international trade faced by American services industries in general, she said.

The preliminary study will help define the issues so that a coherent U.S. policy on information services trade can be developed.

The work coincides with studies the agency is preparing of the insurance, construction and shipping industries. Information services were singled out for special study because they constitute "an area where barriers are going up very rapidly," Adams explained.

The first step in developing trade policy is to identify specific problems and link them to existing trade agreements while developing a national consensus on "how we should move ahead," Adams said. In short, the USTR is trying to "hash through the basic questions."

"You can't talk about privacy forever," she continued. There are other issues affecting international information trade, but so far they have not been well documented.

### USTR Involvement

Although there has been a great deal of domestic and international activity relating to transborder data flow, the USTR has until now confined its involvement to individual cases of trade barriers to information services trade brought to its attention, Adams said.

The House of Representatives held hearings recently on transborder data flow and related problems facing U.S. firms that market information and telecommunications services abroad.

Those hearings, conducted by the House Government Information and Individual Rights Subcommittee, produced testimony from the public sector suggesting the USTR should become more involved in data flow issues [CW, March 17,31].

The USTR at that time told the subcommittee it is trying to develop more expertise and to determine exactly what its role should be in this area relative to trade [CW, April 28].

The record of those hearings will be incorporated in the USTR study, she said, as will additional information obtained by the House panel from several Fortune 500 companies.

Adams added that IBM, the Association of Data Processing Service Organizations, Inc. and the Information Industry Association are among organizations that have provided data.

Adams speculated that any USTR involvement in international data flow negotiations is "probably a few years down the road." The first step down this road is to develop a policy structure for those negotiations.

When problems in information services trade are more clearly identified and better understood, the USTR can develop that policy structure, she added.

### Submissions Asked

Announcement of the USTR study, published late last month in the *Federal Register*, asked interested organizations or individuals to make written submissions in 20 copies to the Secretary, TPSC, Room 735, 1800 G. St., N.W., Washington, D.C. 20506.

The information "should be categorized by current and/or anticipated barriers to such trade to the country and should include any information concerning the trade implications of the barriers, possible foreign motivations for imposing the restrictions and any other relevant information," the announcement said.

Requests for confidentiality of propietary information will be respected, the agency added.

## Univac, China Sign Agreement

BLUE BELL, Pa. — Univac has signed an agreement with the State Administration of the Computer Industry (Saci) and the China International Trust and Investment Corp. (Citic) to provide technical assistance in the People's Republic of China.

The agreement will enable Saci and Citic to conduct education and training programs, provide customer support to Univac users and develop and modify software.

Both parties believe the agreement, which is subject to both governments' approval, is the first step toward a major international joint venture, Univac said.

## CCT, YES Announce Decision to Merge

SANTA BARBARA, Calif. — Computer & Communications Technology Corp. (CCT) and Yang Electromagnetic Systems, Inc. (YES) have reached an agreement in principle for the merger of YES into CCT, according to a joint announcement.

YES, a privately owned company located in Ventura, Calif., is a leading supplier of single- and double-sided magnetic recording heads for floppy disks.

Although no purchase price was announced, the terms of the agreement in principle provide that the shareholders of YES will receive common stock of CCT. The merger would be treated as a pooling for CCT accounting purposes.


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# Supershorts

Informatics, Inc.'s Mini Marc, a minicomputer-based automated cataloging system for libraries, received the 1980 Information Technology of the Year Award from the Information Industry Association.

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California Computer Products, Inc. will begin marketing the Sanders Associates Graphic 7 line of intelligent, interactive display systems.

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Mountain Hardware, Inc. has changed its name to Mountain Computer, Inc.

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Datagraphix, Inc. and Siemens AG have jointly announced that Datagraphix will market an on-line version of the Siemens laser printer, the Datagraphix 9825. The 9825 will operate on-line to IBM 370, 30 series and 4300 mainframes.

---

Martin Simpson Research Associates, Inc. has changed its name to MSRA, Inc.

---

Keane Associates, Inc. has changed its legal name to Keane, Inc.

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University Computing Co., a subsidiary of Wyly Corp., has acquired ownership and marketing rights to Dimension V batch. The data center scheduling package, which includes Deadline and Streamline, was purchased from Software Systems Corp., McLean, Va.

---

Harris Corp.'s Data Communications Division will form a specialized marketing team to address the automotive industry and support Harris systems already installed at automotive accounts.

---

Construction Data Systems, Inc. has been established as an affiliate of Distribution Management Systems, Inc. It will specialize in the development of software for the construction and contracting industries.

---

OEM terminal maker Beehive International said it will now utilize industrial distributors to address end-user markets.

---

Management Science America, Inc. has expanded its data center at company headquarters in Atlanta. The company added an IBM 3033-N8 on Aug. 1 and will subsequently replace the existing 370/158 with a 4341.


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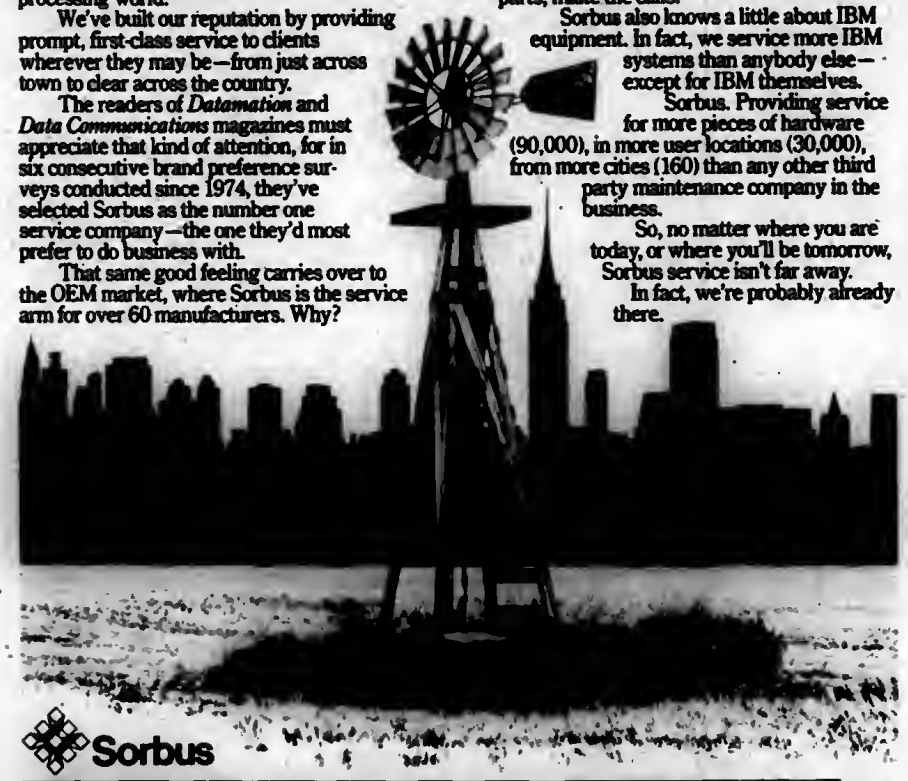

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# Burroughs Seeks To Buy SDC

*(Continued from Page 61).*

System Development Foundation and nearly all of the remaining third is owned by employees. The company does not foresee any major opposition to the acquisition.

One of the nation's oldest software firms, SDC is based in Santa Monica, Calif., and has an interesting history. It was spun off as a nonprofit corporation from the Rand Corp. in 1956. In 1969 it became a for-profit company and at that time the foundation was established.

Today the foundation is overseen by six trustees and has mandated to release the assets of the foundation for cash for use in the state of California. If the acquisition is completed, a major recipient of that distribution could be the University of California's academic programs related to computer sciences.

# CMI Changes Name, Markets

*(Continued from Page 61)*

announced Model 3 — renamed the 1638 — 15 of these processors have been installed in both U.S. and European locations.

With the introduction of a Model 1641, which will be field-upgradable to a 1651, by the second half of 1981, Cambex is now focusing on the high end of the E series, Kruy observed. "It's probably as good a time as any to announce a computer in the E series ... An H series machine would be riskier," he said.

"We expect our computer revenues to be higher than our memory revenues by fiscal year 1982." Kruy also predicted that mainframe revenues would definitely be over $5 million by that time.

When questioned about an organizational plan for coordinating support and service of the new mainframes, Kruy stated that the add-in memory being utilized in the machines made them much easier to service. He also mentioned that Cambex was in the process of working out service agreements with third-party organizations.

"We are re-establishing an end-user sales force," Mike Angier, Cambex marketing director said of a move that began last year [CW, July 23, 1979]. The marketing transition that the firm predicted is now "almost in place," and the next move is to build the overseas sales force, Weill said.

# Denelcor Investors Serious About HEP Supercomputer: Brokerage Activity Spurts

By Connie Winkler
CW Staff

DENVER — The whole scenario is incredible: A small, unsung Denver company announces a supercomputer as fast as — and maybe faster than — the supercomputers now available, and at $1.5 million, one-fourth the cost.

However, Denelcor, Inc. and now some institutional investors are serious about this Heterogeneous Element Processor (HEP) supercomputer [CW, July 15].

"It was incredible to me, too," said Joseph De Felice, a broker-analyst with the New York firm of John Muir & Co. "The story seemed phony." De Felice, who has an engineering background, checked out Denelcor and now reports he's "very enthused." So is the over-the-counter market and particularly a group of Edinborough institutional investors who are at least partially responsible for the recent stock spurt.

An issue of Denelcor went on sale in February at $4.50 a share and recently was near $6-7/8, jumping 5/8 in one day.

Jerry A. Courtier, Denelcor director of communications, said he has been averaging 20 calls a day: "Brokerage activity has been unbelievable."

For the institutional investor, Denelcor is philosophically like the overnight success of Cray Computer Corp. in the mid-1970s, De Felice said. "They have to be there, even if they lose money."

All this is from a company which in 1979 had a net loss of $370,000 on revenues of $2.6 million and a previous year's loss of $19,000 on revenues of $1.6 million

### 'Drifted Into It'

How — and why — did this small company of 65 employees get into the supercompetitive, supercomputer business?

It wasn't any superconfidence or gutsiness to take on IBM, Cray or Control Data Corp., confessed David R. Miller, Denelcor president. "We just sort of drifted into it."

One key was in early June when the U.S. Army Ballistics Research Laboratories in Aberdeen, S.D., awarded Denelcor a $2.4 million contract to continue work on HEP. That first machine should be delivered to the Army by late 1981, Miller predicted. Denelcor has five CPUs in fabrication, (four for the Army), but has yet to get its first commercial customer.

Industry observers note the recent Army contract was a real vote of confidence in the HEP concept, which is a major departure from the present digital computer design.

Because HEP has been Army funded, it has been kept under wraps, but was officially announced in New York in July. Once other Denelcor customers learned of the machine, it was hard to keep it quiet, Courtier said. This was the "drifting" Miller talked about.

"Their business in analog computers was going nowhere," De Felice said, "but because they were in the analog business it gave them a unique perspective on the supercomputer."

Denelcor was formed in 1968 by Miller out of the remnants of other components companies with which he was involved. However, Denelcor also knew the analog business was going nowhere and set out to build a digital computer that would be as fast as an analog.

### Nasa Proposal

In 1973 they made an unsolicited proposal to the National Aeronautics and Space Administration (Nasa) for a digital machine which would replace analog computers. Nasa passed the idea along to the Army which, in 1974, granted Denelcor a study contract and a small hardware contract, Miller recalled.

In 1975 there was a contract for an engineering prototype, which has since been scrapped, but by 1976 the Army awarded Denelcor $2 million for the HEP prototype to be used for ballistics analyses.

It was about this time Denelcor realized it had the makings of a general-purpose scientific computer, Courtier said.

"Because of our unique perspective in design of analog machines, we were very familiar with parallel computing and the need for parallel processing," Courtier said. "We attacked from the parallel computer architecture concept."

### MIMD Machine

What Denelcor came up with is a CPU that can perform different instructions on many data streams simultaneously, called a multiple-instruction, multiple-data-stream (MIMD) computer, believed to be the first. Each CPU can operate on 128 data streams.

Originally a 32-bit word length machine, the word length has been changed to 64 bits in the machine slotted for the commercial market.

Even in a small configurstion the HEP processor can perform 10 million operations per second (MIPS), Courtier said. While a Cray machine, by example, can perform about 23 Mips, that's only on pure vector or array applications — performing the same process (multiply, add) on the multiple data streams. Whether its a vector or a scalar process, it doesn't degrade the performance of the machine, Courtier said.

Because of the modularity of HEP, several CPUs can be configured together for greater processing power. In one Army test, HEP beat the CDC 7600 benchmarks, he added. However, the current prototype HEP is operating without data memory.

"There are no problems at the moment on the prototype," Miller reported. "Everything is designed — a few things have to be built and tested."

Miller believes HEP will be around a long time, noting, for example, the machine is using ordinary logic chips from the ECL 10000 family. "There's lots of room for improvement without changing the architecture," Miller

(Continued on page 66)


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# Dataquest Meet to Focus On Semi Industry in 1980s

SCOTTSDALE, Ariz. — Dataquest, Inc. will sponsor the sixth annual Semiconductor Industry Conference here at the Scottsdale Conference Center Oct. 22-24. Industry speakers will address such issues as the software challenge, the people problem, capital intensity, the outlook for improved quality and productivity and the markets for discretes in the '80s.

A worldwide economic forecast will be presented by Dr. Edgar R. Fiedler, vice-president of The Conference Board. Frederick L. Zieber, vice-president of Dataquest, will unveil his semiconductor outlook for 1981.

Other industry spokesmen will include Dr. Gordon E. Moore, board chairman at Intel Corp.; Charles E. Sporck, president of National Semiconductor Corp.; and John R. Welty, vice-president and general manager of Motorola Semiconductor.

Also featured will be three panel sessions examining procurement and distribution methods for the '80s and the factory of the future. More information is available from Lois Cobb, conference coordinator, Dataquest, Inc., 19055 Pruneridge Ave., Cupertino, Calif. 95014.

# Semicon/East '80 Now Sold Out

BOSTON — The Semiconductor Equipment and Materials Institute (Semi) will host a semiconductor exhibition here Sept. 23-25. According to show manager Shirley Pelnar Heim, Semicon/East '80 is sold out with some "210 companies exhibiting in more than 340 booths." A record attendance of more than 5,000 is expected.

The technical program will focus on advances in materials and very large-scale integration (VLSI), the technology of the '80s. Chairman for the three-day technical event, held from 9 a.m. to noon, is Dr. Winston Samaroo of Western Electric in Princeton, N.J.

Show hours for Semicon/East '80 are 10 a.m. to 6 p.m. Tuesday and Wednesday, and 10 a.m. to 5 p.m. on Thursday.

Registration is $5 at the door; complimentary preregistration forms are available until Sept. 10 from Semicon, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

# Executive Corner

• Storage Technology Corp. has elected John C. Scott, vice-president of domestic sales; Daniel J. Ellis, vice-president of marketing; Norman B. Barth, vice-president of human resources and Richard D. Benson, vice-president of material management.

• Thomas E. Mc Inerney has been named vice-president of financial services group of Automatic Data Processing, Inc.

• Richard C. Trippett, senior vice-president operations, E. Douglas Larson, vice-president manufacturing and F. John Zepecki, vice-president of design engineering, have been promoted by Magnuson Computer Systems.

• Peter R. Eisenhauer has been appointed vice-president of marketing and sales for Integral Data Systems, Inc., Natick, Mass.

• Computer Consoles, Inc. has announced that William F. Deller is vice-president of engineering.

• International Memories Inc. has named Anthony N. La Pine executive vice-president and chief operating officer.

• Charles J. Hart has been appointed president of Digital Scientific Corp. in San Diego.

• Joseph H. Andre has been promoted vice-president of the minicomputer peripherals division of The Braegen Corp.

• Kent P. Friel has joined Access Corp. as vice-president, corporate marketing, and Joseph C. Schneider has been appointed national service manager.

• Jack R. Mc Inturff has been appointed vice-president of marketing for Precision Data, Inc.

• Apollo Computer, Inc. has elected Gerald W. Stanley, founder and vice-president of marketing-customer services; David G. Lubrano, founder and vice-president-chief financial officer; and Charles P. Spector, founder and executive vice-president-chief operating officer.

• Robert Korman has been appointed vice-president of finance for Data Processing Security, Inc.

• Alfred F. Apple has been named vice-president of marketing at Delta Data Systems Corp.

• National Computer Systems, Inc. has promoted David Helt to vice-president-controller.

• Michael A. Kelly has become vice-president European operations for General Automation in Slough, England.

• Don M. Awedon has been appointed vice-president of Automated Datatron, Inc.

• Troy D. Lemons has been elected vice-president, systems and market development, for Qantel Corp.

• William F. Rooney has been named president of On-Line Systems, Inc., a subsidiary of United Information Systems, Inc., Kansas City, Mo.

• Memorex Corp. has appointed Gordon Smith to the position of vice-president, corporate communications.

• Tom Malek has been named vice-president of marketing and sales for Garry Manufacturing Co., a division of Brand-Rex Co.

• Shugart Associates has promoted Bob Sandie vice-president of floppy disk manufacturing and Joe Smith vice-president of fixed-disk manufacturing.

• Paul C. Ely Jr. and William E. Terry have been elected directors and executive vice-presidents of Hewlett-Packard Co.

• Herbert F. Balzuweit has been named vice-president and controller of GTE Telenet Communications Corp.

• Robert H. Lane has been appointed vice-president, European operations, for Northern Telecom Systems Corp.

# Contracts

Anacomp, Inc. of Indianapolis has been awarded a contract to manage the data processing facility of the Indiana Department of Revenue.

Pertec Computer Corp. has received a contract valued at almost $800,000 for the purchase of Pertec disk drives from Marksbren, Inc.

Computer Research Co. of Chicago has announced an agreement with Electronic Funds Illinois, Inc. (EFI) of Chicago to provide remote on-line financial services. Computer Research Co. will provide automated teller and point-of-sale support for EFI's 650 member banks.

Datatrol, Inc. has received a two-year contract extension to operate and expand the computerized on-line "Daily Numbers Game" for the Rhode Island lottery.

Dataproducts Corp. has been awarded a major printer contract valued at approximately $22 million by Southern Systems, Inc. of Fort Lauderdale, Fla. The three-year agreement calls for delivery of Dataproducts line printers, including its B-Series band, Series 2200 drum and 2550 high-speed charaband printers.

Century Data Systems, Inc. will deliver a number of its Hunter Disk Drives to Atmore Systems, Inc. under the terms of a recently signed contract.

Hewlett-Packard Co. has contracted for the purchase of a three-node nationwide roadrunner network management system for an amount in excess of $2 million.


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This unique conference provides a meeting place to review and compare a significant set of the systems now available and learn about their characteristics from speakers with firsthand experience in developing and utilizing leading DBMS.

Systems presented include examples of applications of a variety of data representation and structuring techniques and examples of diverse manipulation languages such as host-based procedural or English-like nonprocedural. The products span a full range of applications and are operational on a variety of microcomputers, minicomputers and large processors. They also include completely integrated software systems such as TP Monitors, Report Generators, Transaction Processors, Data Dictionaries, and Query Languages. The systems presentations are preceded by sessions on data base fundamentals, data base architecture and new developments in data management. There is a comprehensive review of the steps and guidelines in the procurement/selection of data base management systems and of the comparative metrices of key features that summarize each product and provide the framework for the systems comparison. There is a session on recent technological advances and current problems under research.

Each participant receives a copy of the visuals and texts of the vendors' presentations and large metrices comparing the key features of such leading DBMS as *ADABAS, DATA CENTRAL, DATA COM/DB, DATAPOINT 2200, DB-IV, DBMS-10, DBMS, DMS II, DMS-90, DMS 170, DMS 1100, DRS, GIM II, DRISS, IDS-11, IDMS, IMAGE, IMS, INFOS, INQUIRE, MIDB, MODEL 204, MRDS, NOMAD, OLIVER, PRODUCT 2, QUESTOR, RAMIS, REALTY, SEED, System 1022, System 2000, TOTAL* and others.

*Coordinators:*
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Clay Sprowls, PhD, Professor of Computer and Information Systems, Graduate School of Management, UCLA

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# Investors Serious About HEP

*(Continued from page 65)*

said. The HEP secret is in the switches, which Courtier boasts "are ours and ours alone."

There's no consensus on the market for such $1 million or $1.5 million scientific supercomputers. Miller guesses there's a market for 100 machines; De Felice says 200. However, even that will never be reached, the stockbroker said, because researchers will address themselves to larger markets — as Denelcor is already doing.

"The market is established not so much by demand, but by supply," De Felice observed.

Denelcor has been actively looking for commercial customers, even looking to the Coors Brewing Co., which wants to coordinate its production control, De Felice said. He guesses HEP will continue to be best suited for design applications such as cars and defense equipment.

Because of the huge investments Cray and CDC users have in their installations, it appears no one at this time sees Denelcor directly competing with those supercomputer leaders.

# Orders & Installations

Anglo-American Aviation Co. of N. Hollywood, Calif., has purchased a Univac 1100/61 computer system.

Floating Point Systems, Inc. of Beaverton, Ore. announced a $10.3 million release of orders from the Medical Systems Division of General Electric Co., Milwaukee.

Honeywell Information Systems has sold four Level 6 computer systems to Yahr-Lange, Inc., a wholesale drug distributor in Elm Grove, Wis.

General Data Systems, Inc. has ordered 46 V77-600/200 computers valued at $2 million from the minicomputer operations of Univac.

Davis Hospital, Statesville, N.C., has signed a contract to install the financial information system recently introduced by Spectra Medical Systems, a subsidiary of Medicus Affiliates, Inc.

C.A. Hume & Associates, Inc. has ordered the recently introduced Univac System 80 computer.

# Foreign Orders & Installations

Australia's W.A. Flick & Co. has ordered the Univac System 80.

The Swedish Bank Transfer Services has ordered the Univac 1100/62.

Collins Communications Switching Systems Division of Rockwell International, Inc. has sold its financial network controller to Sparekasserne Datacenter of Denmark.

TSB Trust Co., Ltd. of Andover, UK, has ordered a Redifon Computers R800/70 distributed data processing system.

River Steel Co., Ltd. and Daido Steel Co., Ltd. of Japan have both ordered Univac 1100/60s.

Computer Automation, Inc.'s Naked Mini, teamed with the NMA/10S slave processors, will be acting as the controlling elements in an integrated digital network now being implemented by the South Africa post office.

Vickers da Costa of Sussex, UK, has installed an R50 clustered terminal system from Redifon Computers.

Aisin Seiki Co., Ltd., an affiliate of Toyota Motor Co., Japan, has ordered a Univac 1100/60 system.

Remington Office Machines of Australia has ordered a Univac System 80.

GEC Computers, Ltd. will supply a 4065 system in conjunction with the British Telecom Prestel viewdata software package to the Austrian PTT.

Yasuda Trust & Banking Co., Japan, has ordered a Univac 1100/82 computer.

The Tokyo Women's Medical College has ordered a Univac 1100/60 processor and 51 UTS 400 intelligent terminals.

Equity and Law Life Assurance Society, Ltd., UK, has ordered an 8,000-line/min Honeywell page printing system.

Nippon Airways has installed a Univac 1100/44 computer at Haneda Airport, Tokyo.

The National Computing Centre, Manchester, UK, has taken delivery of an ICL Computers Inc. 2956/10.

Univac has received a $6 million order from the University of Kuwait.

Ferranti Computer Systems, Ltd. is to expand the videodata communications system at the Austin Morris Metro production plant in Birmingham, UK.

The State Savings Bank of Victoria, Australia, has installed two Perkin-Elmer Corp. Data Systems 3240 processors as front ends for an ICL System 4, Model 70.

Ontario Hydro, Canada, has awarded Valtec Corp. a contract for 104 RS-232C-compatible fiber-optic data links and associated PC10 duplex fiber-optic cable.

Honeywell Information Systems, Ltd. will install a computerized hotel management system for the Swallow Hotel chain in Scotland and England.

The West of England Ship Owners' Mutual Assurance Association, Ltd. has ordered a Honeywell Level 64/DPS to replace an IBM 3/12.

Surrey County Council has ordered a second computer system — the 1100/80 — from Univac.

Brunel University in Uxbridge, UK, has ordered a Honeywell Level 68/DPS Multics system.

Codex Corp. will supply TSB Computer Services, Ltd., UK, with a data communications network valued at $5 million.

Valley Software, British Columbia, will install and distribute SMC Inc.'s Business Basic Interpreter for the IBM Series/1, Idol and applications software in Canada.

A consortium of 210 savings banks in Finland has placed an order for Datasaab Systems financial terminal systems worth $13 million.

Nippon Express Co. has placed a $3.2 million order for two Univac 1100/60 series computer systems. The order was placed with Nippon Univac Kaisha, Ltd., Sperry's joint computer marketing venture in Japan.

Michinoku Bank of Aomori, Japan, has ordered two Univac 1100/60 series computer systems valued at $5.2 million. The systems consist of 1100/61 and 1100/62 model processors.

# Nickels & Dimes

United Telecommunications, Inc. increased its common stock dividend to an annual rate of $1.60. The new rate represents an increase of 8 cents.

$$$

Pentil Corp. has announced the public offering of 670,000 shares of common stock at a price of $10.50 per share. Of the shares offered, 600,000 are being sold by the company and 70,000 by certain selling shareholders.

$$$

System Industries, Inc. has filed a registration statement with the Securities and Exchange Commission relating to a proposed initial public offering of 700,000 shares of common stock.

$$$

Anacomp, Inc. has registered a $25 million public offering of convertible subordinated debentures due Sept. 1, 2000 with the Securities and Exchange Commission. Proceeds will be used to repay bank debt and to provide working capital and funds for acquisitions.

$$$

The American Stock Exchange has approved for original listing 2,048,176 common shares of Timeplex, Inc., the manufacturer of data communications equipment. Trading in these shares was scheduled to begin Aug. 13.

$$$

CGA Computer Associates, Inc. has filed a registration statement covering the proposed offering of 480,000 shares of its common stock. Of such shares, 300,000 shares will be offered for the account of the company and 180,000 shares will be offered for the account of certain stockholders.

$$$

The board of directors of Electronic Memories & Magnetics Corp. has voted to pay a dividend of 50 cents per preferred share, which includes a current quarterly dividend of 25 cents per share and an additional 25 cents per share of dividends previously in arrears, reducing the remaining arrearage to 25 cents per preferred share. The 50 cent dividend will be paid Sept. 10 to stockholders of record Aug. 27.

$$$

Wang Laboratories, Inc. has voted to recommend to the shareholders at the annual meeting on Oct. 28 an increase in the authorized shares of Class B Common stock from 30 million shares to 70 million shares.

$$$

MSI Data Corp.'s directors have approved the reincorporation of the company in Delaware. The reincorporation will be accomplished by the merger of the company into a wholly owned subsidiary, Delaware Corp., which would be the surviving corporation in the merger.

$$$

Timeplex, Inc.'s board of directors has authorized a six-for-five split of its common stock in the form of a 20% stock distribution. The distribution will be issued on Sept. 8 to holders of record on Aug. 8. Cash payments in lieu of fractional interests will be made.


# OEM America Meets

## At The Invitational Computer Conferences

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In one day, at each 1980/81 ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry. Some of the companies which participated in the 1979/80 ICC Series were: ADDS; AVIV Corp; Applied Data Communications; BASF Systems; Cambridge Memories, Inc.; Centronics; Century Data Systems; Cipher Data Products; Compugraphic; Computer Devices; Control Data Corp.; Data Systems Design; Dataproducts Corp.; Dataram; Datasystems Corp.; Diablo Systems; Documation; Emulex Corp.; Facit Data Products; Florida Data; Hewlett-Packard; International Memories, Inc.; Kennedy Company; Lear Siegler; MDB Systems; MFE Corp.; Microdata; Monolithic Systems; Mostek; NEC Information Systems; National Semiconductor; Olivetti; Perkin-Elmer Memory Products; PerSci, Inc.; PCC/Pertec; Pioneer Magnetics; Plessey Peripherals; Powertec; Priam; Printronix; Remex; Rianda Electronics; Scientific Micro Systems; Shugart Associates; Siemens; Storage Technology; TEC; Tally Corp.; Teletype; Telex Computer Products; Texas Instruments; Trilog; Universal Data Systems; Versatec; Xylogics.

The schedule for the 1980/81 Series is:

| | |
|---|---|
| Sept. 8, 1980 | Newton, MA |
| Sept. 30, 1980 | Valley Forge, PA |
| Oct. 22, 1980 | St. Louis, MO |
| Nov. 18, 1980 | Palo Alto, CA |
| Jan. 13, 1981 | Orange County, CA |
| Feb. 3, 1981 | Ft. Lauderdale, FL |
| Feb. 5, 1981 | Atlanta, GA |
| Mar. 3, 1981 | Dallas, TX |
| Mar. 5, 1981 | Houston, TX |
| Apr. 2, 1981 | Denver, CO |

Invitational Computer Conferences

Invitations are available from participating companies or the ICC Sponsor.
For further information contact:
B.J. Johnson & Associates, Inc.
2503 Eastbluff Drive, No. 203
Newport Beach, CA 92660
(714) 644-6037

"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."

# Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

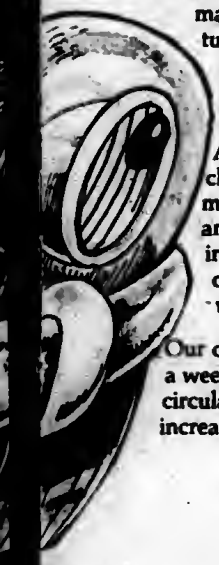
We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear).

In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.



A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 105,000 (quite an increase from our modest 7,500 in 1967).

*COMPUTERWORLD* serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

*COMPUTER BUSINESS NEWS* is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD*. We report from the user's point of view – with product ratings, and information on using small computers in business and at home. It's a paid circulation, bi-weekly newspaper, and the only publication of its type – located right in the middle of silicon valley — where it's all happening.

The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil and Mexico.

And we provide U.S. advertising representation and editorial services to publications in the following countries: Italy, France, Greece, The Netherlands, Sweden, Argentina, Chile and Southeast Asia.

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- OPERATING SYSTEMS SOFTWARE
- DATA BASE ADMINISTRATION SOFTWARE
- TEST UTILITIES SOFTWARE
- SYSTEMS TEST AND CONTROL

If you have a BS/MS degree in Computer Science, Electrical Engineering, or related discipline with experience in any of the above areas, contact us for more details on the future opportunities in Phoenix. Use the mini-resume below for quick response, or forward a current resume to: Manager, Technical Employment, Dept. 471 A-6, GTE Automatic Electric Laboratories, 400 N. Wolf Road, Northlake, IL 60164.

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**Framingham, Mass. 01701**

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[redacted]

Position Description: Responsible for translating into the proper level of computational and information processing support to enable positions to support the basic teaching, research, consulting and public service functions of the University. Work with the administration, faculty and staff to determine the computational and information processing needs of the University and develop systems to meet these needs. Develop short and long-term budget plans for information support and seek funds, from institutional or other sources, to meet budget projection. Reports to the Vice President of Administrative Services.

Qualifications: Advanced degree in Computer Science or closely related field desired. Three to five years of supervisory/administrative experience in data processing. Broad knowledge of computer equipment and programming systems. Managerial and supervisory skills.

Application deadline: Sept. 15, 1980.
Starting date: Immediately
Salary: Open

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The Computer Science Program at Illinois State University has faculty positions to be filled by September 1, 1981. Applicants must have a Ph.D. or M.S. in Computer Science or a related field. Applicants with a Ph.D. will be eligible for tenure. Duties will include instruction of undergraduate and graduate classes and research related duties. Candidates with interest and experience in operating systems, networks and languages will be given preference. Contact:

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- Hardware Requirement Analysis
- Systems Acquisition
- Training: Plans & Evaluation

**For a prompt response, mail your resume in full confidence to The Director of Professional Staffing, MC/218-ID**

CSC

**SYSTEMS DIVISION**
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Need experienced systems/analysts to join young dynamic team involved in programming support for scientific personnel and development and maintenance of administrative systems for petroleum research institute. Should have background in IBM Systems, COBOL, Fortran, OS/VS, TSO and VM/CMS. Duties will include analysis of systems, systems, planning and systems development. Candidate should have minimum of 3-5 years experience in the above areas and a degree. Fluency in Spanish required. Please rush resumes with salary requirements to clients consultant:

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# WHAT IS OPPORTUNITY?

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**Where is this opportunity? With the fastest growing semiconductor firm of recent times—Advanced Micro Devices. To give you some idea of our enterprising spirit, our first quarter sales surpassed $70.6 million! That's a 40% increase over the same period in 1979.**

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Now that you know what AMD has to offer, consider offering us your experience and abilities in one of the following areas:

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**INSTRUCTOR/TRAINING COORDINATOR**
**COMPUTER OPERATORS**

For immediate consideration, submit your resume, detailing employment and salary requirements, to D. WARD, ADVANCED MICRO DEVICES, 901 THOMPSON PLACE, BOX 453, SUNNYVALE, CA 94088. OR TELEPHONE (408) 732-2400 ext. 4098, COLLECT. All resumes and inquiries will be held in strict confidence.

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To apply, please call Gil Patton or Kay Donovan at (304) 647-4358. Or send resume indicating position of interest to: Employee Relations Department, Bendix Environmental and Process Instruments Division, P.O. Drawer 551, Lewisburg, West Virginia 24901.

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**[illegible] 1980/81**
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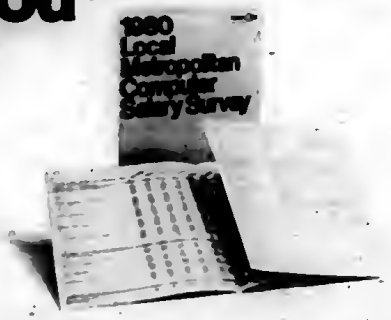


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## REAL TIME O/S DESIGN

Our client has an excellent career opportunity available to an experienced Professional to work as a Project Leader in the design of high speed Real Time Operating Systems for Telemetry applications. Duties will include structured programming using HOL (PASCAL, PLI, ADA) desired with UNIX or VAX VMS experience ideal. The selected candidate must understand CPU Architecture and HW/SW Trade Off options and possess BS/MS EE/CS.

Salary and benefit programs are structured to enhance your lifestyle in beautiful Florida. Please submit your resume, including salary history, in confidence or call:

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**Experience:** Two years of recent paid experience in programming with emphasis in COBOL, one year of which must have included experience with third generation hardware and software with emphasis in direct access storage devices. One year of equivalent programming experience may be substituted for the required college education.

The District has installed an IBM 370/138 running under DOS/VS, with plans to move to DOS/VSE. We utilize an on-line program development system to support installation and maintenance of educational, financial and payroll/personnel teleprocessing applications.

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The individuals selected will be working in an environment that consists of IBM 3031-AP and 370/148 computers, operating under DOS/VS, with a conversion to MVS in process. Application development utilizes BAL and COBOL languages and includes the use of teleprocessing and data base techniques.

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Current programs are run in SPIRES and IBM 370/Assembler under the Michigan Terminal System (MTS) on an IBM 3033. The library is developing a set of integrated programs dealing with the full range of library operations.

Required: Knowledge of IBM 370/Assembler; Bachelors degree; working knowledge of state-of-the-art computer hardware, software, programming, and systems analysis; ability to communicate effectively in oral and written forms with programmers, librarians and non-technical personnel.

Preferred: Knowledge of SPIRES, data processing in an academic or research library; and appropriate Masters' degree.

Salary commensurate with experience, minimum $20,000.

Rensselaer Polytechnic Institute is an independent technological university with approximately 6000 students and 400 faculty, offering advanced degree programs through the Ph.D. in engineering and the sciences. Send resume and names of three references by October 31 to James G. Anderson, Library Director, Folsom Library, Rensselaer Polytechnic Institute, Troy, N.Y. 12181. An Affirmative Action, Equal Opportunity Employer

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## We Like To Have The Best

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Several positions are now available for highly-motivated experienced computer software support professionals in our Data Processing/Word Processing Software Support Group. These positions will enable qualified candidates to enhance their knowledge of state-of-the-art computer software and architecture while performing a wide variety of exciting and challenging assignments.

The DP/WP Software Support Group is part of the Wang customer and field support organization for our VS Computer Systems, Integrated Information Systems, and Office Information Systems. This group works closely with Software R&D, Market Planning & Development, and Software Quality Assurance so that our clients benefit from the best possible support available. In addition to in-depth problem solving and consultation, this group performs a variety of other stimulating functions, such as conducting technical seminars and on-site troubleshooting.

We are looking for hard-working individuals who thrive on responsibility and respond well under pressure. You must enjoy working with people. Good communications skills are essential and you must be able to travel.

If your tastes match ours and your technical abilities qualify you to join one of our project groups, we would like you to become part of our team. This could be one of the most important steps you take in your career development.

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### VS Software Support

Responsibilities for the VS Software Support Project Group include problem solving and consultation in the areas of the VS Operating System, VS Compilers, and VS System Utilities. Also included are benchmarking and performance testing. The technical requirements for these positions include an in-depth knowledge of COBOL, BASIC, or RPG II and experience with Virtual Storage Operating Systems, preferably as a technical support specialist. Experience with Data Management Systems or Telecommunications is beneficial.

A college degree is desired with a Computer Science degree preferred.

### Support Analyst
### Integrated Information Systems and Office Information Systems

Responsibilities include providing in-depth technical support for customers and Wang field personnel on VS/WP and OIS systems. Requirements include a college degree, preferably in Computer Science. The successful applicant must also have prior experience in COBOL or BASIC and knowledge of Word Processing in an Integrated Information Systems environment. Operating Systems experience is also beneficial.

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### Corporate Computer Center — Windsor, Conn.

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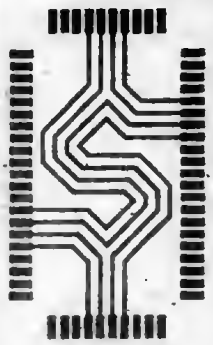
# Technical Support Analysts



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So, while we're just a few miles away from the high technology of Santa Clara's "Silicon Valley," you won't find our Advanced Development Center amidst a busy, distracting manufacturing plant or caught up in the hot competition of marketing and sales. Instead, you'll find a team of top development pros, living and working in a small, cozy town nestled at the foot of the Santa Cruz Mountains, reminiscent of Old California. Drive a few minutes West and you're standing on the rugged Pacific coastline; a few minutes East and you're on the doorstep of one of the most concentrated high technology areas in the world.

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Call or send your resume, with salary history, to Carole Clark, Professional Employment, Mohawk Data Sciences Corp., Advanced Development Center, 102 Cooper Court, Los Gatos, CA 95030, (408) 395-2160. We are an equal opportunity employer m/f/h.

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The Computer Systems Division of Perkin-Elmer's Computer Operations is responsible for designing, developing and manufacturing 32-bit minicomputers and systems for markets throughout the world. We presently have openings for the following:

## Product Manager Scientific Languages

This position gives you the opportunity to play a key role in sustaining Perkin-Elmer's scientific leadership with the following responsibilities: formulate product strategies for current and new Perkin-Elmer scientific languages products, including FORTRAN, PASCAL, CORAL 66, BASIC and ADA; propose new product capabilities; monitor implementations of scientific languages products; manage product introductions including training of field staff; and maintain competitive awareness. Qualifications include a technical degree (MBA an advantage), proven communications skills, and 10 years experience on scientific applications of computer systems—exposure to compiler writing an advantage.

## Product Manager Processors

You will formulate product strategies for current and new Perkin-Elmer processors and architectures, including multi-processing, multi-processor, and language based system architecture; propose new products capabilities; monitor implementation of processor products with development and manufacturing; and maintain competitive awareness. Qualifications include proven leadership and communications skills; 3 years marketing or product management of computers or related hardware; and engineering degree or equivalent.

## Competitive Analyst

You will collect, analyze, maintain and distribute relevant data related to Computer Systems Division competitors to support the Marketing Department. Information on these competitors will be gathered from trade publications, Auerbach/data pro, trade shows, sales force contacts, and personal contacts throughout the industry. Responsibilities will encompass producing periodic reports of competitors activities for sales, marketing, and internal usage; defining structure of Competitive Information Handbook for field sales usage; providing special competitive reports for product managers or market managers as required; establishing and maintaining EPAI agreements; and distributing up-to-date information on Perkin-Elmer products to data pro, Auerbach, and other competitive services.

As a high technology Fortune 500 leader, we offer excellent salaries and comprehensive benefits package, including profit sharing, hospitalization and paid dental plan. For prompt consideration, please send your resume to: John Travers, Perkin-Elmer, Computer Systems Division, 106 Apple Street, Tinton Falls, New Jersey 07724. *An equal opportunity employer m/f.*

**PERKIN-ELMER**

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Programmers

## Operating Systems Programmers / Engineers

Are you interested in state-of-the-art operating systems development?

Olivetti Advanced Technology Center is involved in the design and implementation of an advanced operating system.

Our design staff consists of top people from both the industrial and academic communities. We are seeking bright, creative people to join our O.S. development.

Do you have experience in building or designing operating systems for small or medium sized computers?

Do you practice structured design methodologies?

Do you believe that high-level, structured and typed languages are the right tools to build systems?

Do you have at least a Master's degree in Computer Science (or related field) or a Bachelors and systems programming experience?

Do you want to use and implement advanced Operating Systems concepts?

Does working with a system targeted for a state-of-the-art processor interest you?

If your answers to these questions are yes, we have a position for you. We are a small company environment with the advantages of the support of a large corporation.

We are located in the South San Francisco Bay Area. The climate and cultural advantages of the area are world famous. Two major universities, Stanford University and the University of California, Berkeley, are located nearby.

Olivetti offers competitive salaries and a complete benefits package. Forward resumes to Mike Meehan, Olivetti Advanced Technology Center, Inc., 10430 S. De Anza Blvd., Cupertino, CA 95014. An equal opportunity employer. M/F.

**olivetti**
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We are a rapidly growing multi-plant manufacturing company in need of an ambitious individual to assist with the implementation of manufacturing applications and conversion system on an in house VAX-11/780 computer. Programming for this and other new general accounting systems will be by way of interactive terminals in a small D.P. department.

Applicants should have, as a minimum, a 2 year college degree and 2 years of general accounting COBOL programming. Attractive starting salary and benefit package including hospitalization, dental and profit sharing. Qualified applicants please submit resume in confidence to Personnel Department, **HONEYWELL Scientific, Inc.**, 1011 Pierce Butler Route, St. Paul, Minnesota 55104.
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Dianne Maples

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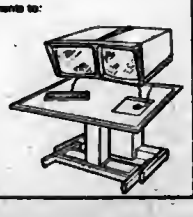

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## TECHNICAL ASSISTANT

Florida's gold coast and Tropicana, a growth company with vision, combined to create an exciting environment for an individual with technical support experience. Your systems design, business, accounting, or mathematics degree plus 3 or more years experience in technical support on BURROUGHS 6700, 6800, 7700, or comparable equipment could qualify you for this opportunity. The ability to handle D.M.S., II and N.C.P. as well as proficiency in related communications techniques and software are also required.

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ROBERT HALF
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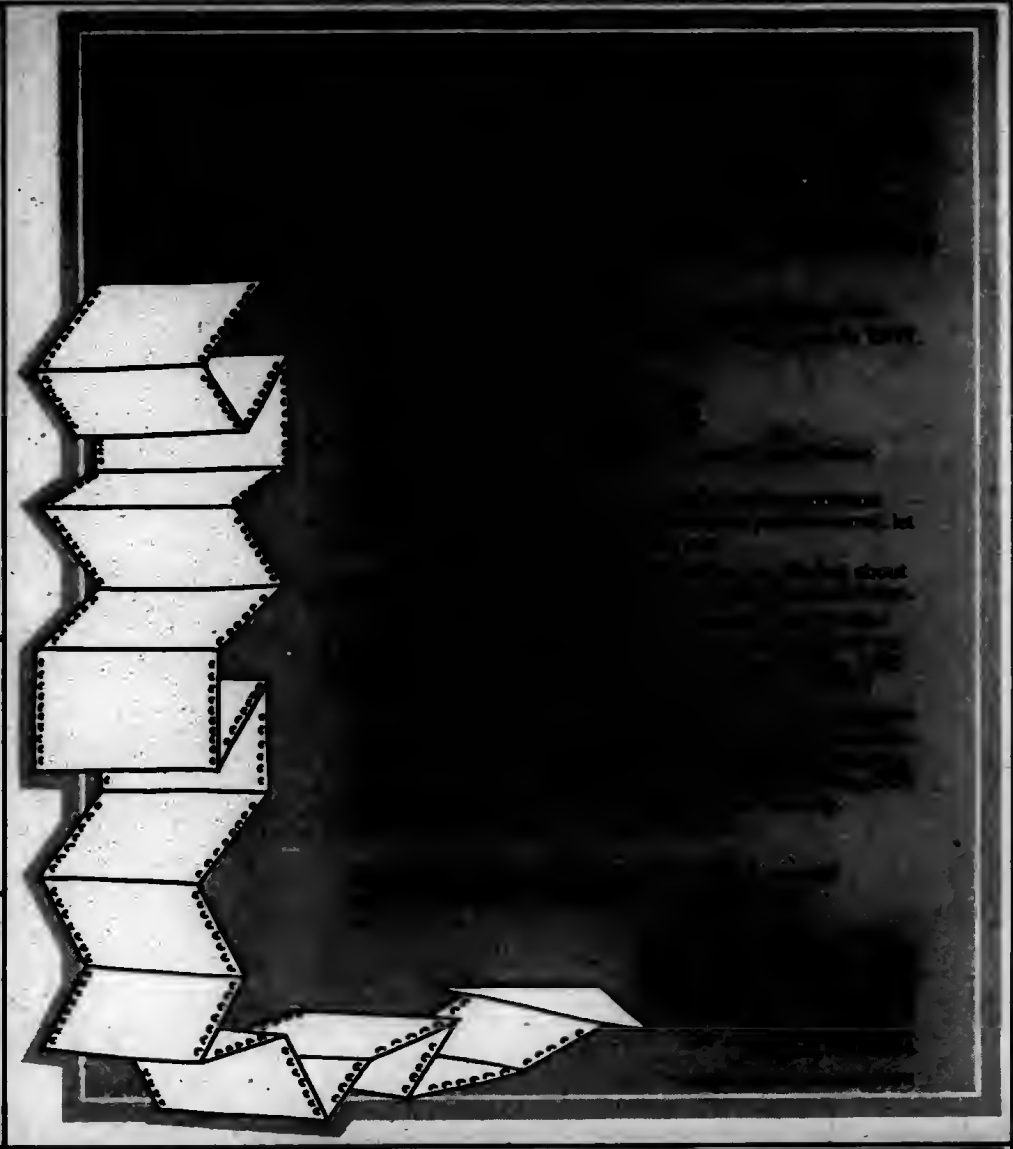
(504) 524-3773

## SYSTEMS PROGRAMMER

Position involves implementation of University administrative and academic applications. Desired background is minimum 3 years experience in DOS/VS, COBOL, and Assembly language. Knowledge of CICS helpful. Will be involved in initial stages of development with IBM 4331 hardware functioning with DOS/VSE operating system. A degree in computer science or equivalent experience required. Excellent benefits and salary, opportunity for personal growth. Send resume with salary history to The Personnel Office, LEHIGH UNIVERSITY, 100 Brodhead Avenue, Bethlehem, Pa. 18015. Equal Opportunity Employer, M/F



# FIELD ENGINEERS

DOCUMATION INCORPORATED, a leading manufacturer of computer I/O subsystems and peripheral equipment, now has excellent opportunities for Field Engineers throughout the United States.

Applicants should possess a knowledge of digital and analog circuitry, plus 1-2 years experience with IBM or Burroughs compatible equipment, especially printers, card punches and card readers.

We offer competitive salary and benefits package, as well as a real growth opportunity that will excite your imagination and challenge your professional expectations. Direct your resume with salary history and geographical preference to: Ed Johnson, Dept. 582.

**DOCUMATION INCORPORATED**
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# DATA PROCESSING MANAGER

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Individual will be responsible for the management of a rapidly growing Data Processing organization. MUST be a responsive, highly-skilled, articulate, decisive leader with the ability to diplomatically orchestrate the demands of a diverse group of users to assess the most effective utilization of the system and resources. Successful candidate will assign, schedule, monitor and coordinate assignments in compliance with budget constraints and user requirements. Will maintain effective liaison with user departments. Will also guide conversion to the new system (From IBM System 24 to Data General Eclipse) Must be proficient in both hardware and software utilization.

Position requires minimum ten years data processing experience which must include manufacturing activities. MUST have minimum three years successful managerial experience preferably in a manufacturing setting. Must have strong systems/application background, which should include on-line manufacturing/accounting application design/implementation. Prefer appropriate degree and APICS certification.

Candidate for this position is encouraged to send resume in confidence, or, for more information call: Geoff West, (714) 540-9630, collect.

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Data Processing

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*Our continued growth has created openings in key areas in our San Francisco headquarters:*

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- **Data Communications**
- **Training and Technical Support**

The positions require experience and working knowledge of UNIVAC 1100/60, IBM System 38 or IBM 3033 computers, and specialized skills in one or more of the following areas:

- Computer Graphics
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- Data Base Management
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- Hardware Planning
- Data Dictionary
- Operating Systems and Utilities
- Development of Programming Methodologies & Standards

For immediate consideration, call our 24-hour, toll-free number: 1-800-821-7700, ext. 607 In Missouri, call 1-800-892-7655, ext. 607

Or send your resume to: J. Bolline, Bechtel Power Corporation, Employment Dept. 15-16-60, P.O. Box 3965, San Francisco, CA 94119

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# COMPUTER PROGRAMMER

## Construction Industry

Dynamic Industrial Constructors, a mechanical construction company, has an immediate need for a Computer Programmer with RPG experience for their office in New Orleans. Other computer language experience would be helpful.

Qualified candidate will work on IBM 38 equipment after completing a 5 week study course in basic IBM languages. Responsibilities will include technical programming in the following areas: costing, planning, scheduling, and estimating. Construction industry experience a plus.

DYCON offers a competitive salary structure, comprehensive company benefits and a generous relocation package. For immediate consideration, please send your resume to:

Chris Fite
Dynamic Industrial Constructors
DYCON
P.O. Box 19062
Jefferson, LA 70181
(504) 835-8726

# WORLD HEALTH ORGANIZATION

invites applications from experienced programmer analysts interested in working in a team providing data processing support to a multidisciplinary group conducting large scale clinical trials and behavioural science research.

Applicants' qualifications should include:

- university degree, preferably in computer science, statistics or mathematics, or equivalent experience;
- recent experience in analysis and advanced programming, preferably in PL/I and in a scientific environment;
- knowledge of statistics plus familiarity with SPSS, SAS and BMDP;
- experience in a large IBM (370, 3033) TSO working environment;
- an excellent knowledge of English or French (working knowledge of the other language would be a definite asset.)

Interested and qualified applicants should send a detailed curriculum vitae to:

**Chief of Personnel**
**World Health Organization**
**1211 Geneva 27 Switzerland**

quoting the reference "EDP Vacancies — 1980".

An equal opportunity employer (M/F)
Only candidates under serious consideration will be contacted.

# SENIOR PROGRAMMER ANALYST

**Salary:** $2,148 to $2,522 (depending on qualifications)

**Education:** Graduation from a recognized four year college

**Experience:** Four years recent paid experience in programming and systems analysis. Programming experience must have been in COBOL, on medium to large third generation, multi-programmed systems. At least two years experience must have been in designing and writing programs for on-line data entry and retrieval. Up to two years of additional experience may be substituted for two years of required college education.

The District has installed an IBM 370/138 running under DOS/VS, with plans to move to DOS/VSE. We utilize an on-line program development system to support installation and maintenance of educational, financial and payroll/personnel teleprocessing applications.

**Apply:** Long Beach Unified School District
Personnel Commission — Rm. 314
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The selected candidate will manage the Technical Support Department and be responsible for Data Base Design & Performance; Systems Hardware/-Software; Planning and Budgeting in a distributed on-line environment using DECsystem-10 and PDP-11s. Will also participate in MIS Strategies/Decisions.

Must have strong hardware/software background in Digital products. At least 6 years overall technical experience and at least 2 years supervisory experience desired.

Qualified applicants may send resume and salary history to Y. Britt, Digital Equipment Corporation, Dept. 825-3007, P.O. Box 36200, Phoenix, Arizona 85069. We are an equal opportunity employer, m/f/h.

digital

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DATA PROCESSING

## PROGRAMMERS

Seeking an informal but state-of-the-art company with excellent growth opportunities? Our SAN FRANCISCO based operation has an immediate opening for YOU!

Interested applicants must have a strong working knowledge of:

- COBOL, JCL and UTILITIES within the IBM OS/VS1 Operating System.
- Knowledge of TP or DB (CICS, SHADOW II, IDMS, DLI) required.

MANAGER OF PROGRAMMING—Minimum of 3 years' COBOL and/or ASSEMBLER with current PROJECT LEADER experience.

SENIOR PROGRAMMERS—Minimum of 3 years' experience with COBOL and/or ASSEMBLER.

Positions require excellent communication skills and ability to work independently.

In addition to opportunities for advancement in a fast-paced, innovative environment, CALIFORNIA DENTAL SERVICE offers an all encompassing employee benefits package.

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# COMPUTER ARCHITECTS AND ENGINEERS

**(Hardware • Systems • Software/Firmware)**

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Our mission is to develop computer capabilities well beyond the limits of today's largest operational systems. Long term, heavily funded projects call for radical design concepts, original invention, and innovative application of special device techniques to 16- and 32-bit computer architecture.

In exploratory probes, we'll be using CMOS/SOS, $I^2L$, multiple instruction sets, and custom gate arrays. The work presents what may well be the ultimate challenge to the most inventive computer experts. It could also change the course of computer design. We have immediate openings for:

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Must have at least 8 years experience in all aspects of computer systems and logic design implementation, microcontrolled architecture, cache memory concepts, I/O, memory interface, and CPU structuring.

### MANAGERS

Must be experienced in task and team leadership, and expert in all phases of CPU design. Hardware leaders should have computer or military electronics experience. Software leaders need military systems background.

### PROJECT/SYSTEMS ENGINEERS

To work on CPUs, peripherals, and communications networks.

### SOFTWARE/FIRMWARE ENGINEERS

To design operating systems and to contribute to definition and architecture.

*As a growing leader in complete military electronics systems, Norden puts you in a high recognition setting with every quality needed for professional satisfaction.*

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**DATA COMMUNICATIONS SYSTEM DESIGNER** — To 28K

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# Administrative Computing Opportunities

Cornell University is embarking on a major program to update all of its Administrative Computing systems. Experienced systems analysts, project managers and programmers are needed to participate in this planned move from batch to interactive and on-line systems.

The first project, to be starting in the fall of 1980, will be to design and install a new, integrated student records system to serve the University and College registrars. Future year calls for extending the system to the Financial Aid, Admissions, and Bursar's functions. In addition to these projects in the student area, new on-line systems are planned for Alumni Records, Accounting, Budgeting and Personnel.

The University operates on IBM VM 370/168 system with OS/HASP batch environment. IBM 4341's are planned for installation in November and January 1981 to provide development and transition machines to a major mid '81 upgrade.

The following positions are immediately available:

**SENIOR SYSTEM ANALYSTS** to be responsible for the overall project leadership and system design and development, including working with University and college administrators as well as technical staff. A Master's degree in Business Administration, Computer Science or a related field plus a substantial record of accomplishment in systems analysis and design, (student data systems would be an asset), is required. Familiarity with interactive administrative systems and data base management and IBM operating systems plus supervisory experience and strong communication skills are desirable.

**SYSTEMS ANALYSTS OR APPLICATIONS PROGRAMMERS** to work under project leaders and who will be responsible for the design, development, installation and maintenance of sub-systems of the overall system. A degree in Computer Science, Business Administration or a related field plus 2 or more years experience, (developing and programming college or University systems would be an asset), is desirable. Experience with PL/1, VM/CMS or OS/MVS, and Data Base Management systems is highly desirable.

Salaries offered will be competitive with education and experience. In addition, Cornell offers excellent benefits, including an employee degree program and free tuition for job related courses (graduate Computer Science Department and School of Business Administration are among the best in the nation) and children's tuition scholarships. The Ithaca area offers outstanding recreational and cultural opportunities as well as unique shopping and restaurants in an exceptionally attractive environment.

Qualified individuals are encouraged to send a resume, including salary history & requirements to: Mr. Edmund V. Hollenbeck, Assistant Director for Administrative Programming Services, B-49 Day Hall, Cornell University, Ithaca, N.Y. 14853.

Cornell University

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- — IMA data base technical support
- — IBM systems programming

The September and October interviews will be the last for a year, so please call before you turn the page.

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Tran Telecommunications, manufacturer and designer of digital telecommunications network switching systems, has immediate opportunities for Software Systems Engineers experienced in data communication devices. You will report directly to the Director of Product Development.

Those selected will become involved in systems design and specification of communications devices developed by our innovative concern, as well as specify architecture and implement software for various products. You will also have the chance to participate in and manage product development activities.

Background should include experience in IBM 3705/3270 with expertise in various protocols (BSC, HDLC and/or X.25) and participation in actual development and communication devices/products. 327X emulation experience in SNA environment is a plus. BSR/BEE or Computer Science is desirable, as is experience in realtime programming of micro and multiprocessors architectures.

Tran offers an excellent salary and benefits package, complemented by excellent potential for career progress. For immediate consideration, please forward resume and salary history, or call:

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**Lockheed**

Lockheed-California Company
Burbank, California

# Saudi Arabia

Saudi Maintenance Company, Ltd. (SIYANCO) has been awarded a contract by the U.S. Army Corps of Engineers supporting the Saudi Arabian Army Ordnance Corps. A significant part of this effort is the continued development of an extensive computer system and its operation throughout the Kingdom of Saudi Arabia.

Hardware consists of IBM System/3 and 370 computer families, both disc and tape, and languages including COBOL, RPGII, JCL and Assembler Language.

Some of our current job openings are as follows:

## SENIOR SOFTWARE PROGRAMMERS

You will be responsible for the technical support of application programming and computer operations by creating, maintaining, modifying and implementing software systems. You will also be required to provide systems software assistance at remote computer sites, as well as central computer facility. A college degree in Computer Science or Mathematics, or equivalent experience preferred; and programming experience with latest IBM software which includes COBOL, RPGII, Power/VS, JCL, DOS/VS, CICS/VS, Assembler Languages, and VSAM is required.

## SENIOR and SITE DATA PROCESSING CO-ORDINATORS

You will provide advice and assistance concerning specialized topics pertaining to teleprocessing/telecommunications, information retrieval systems techniques and advanced programming methods as required. Additionally, you will insure that updates and/or changes to master program are explained, documented and implemented by each site. Experience with Data Base Retrieval, Modular Programming, Mathematical Programming and Programming of Decision Logic Tables and Structured Programming techniques is necessary and ability to program in COBOL and Assembler Languages is required, plus familiarity with Job Control Language and RPGII. College degree in Mathematics or Computer Science or its equivalent along with previous supervisory experience are needed.

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You should be versed in 370 hardware capabilities currently being utilized with knowledge of applications and modular programming for complex systems designs and must be a proficient programmer in COBOL. Familiarity with RPGII and Assembler Languages, five years cumulative experience in ADP programming and past or current involvement with a sizeable systems programming effort are required. College degree in Computer Science or Mathematics, or equivalent practical experience preferred.

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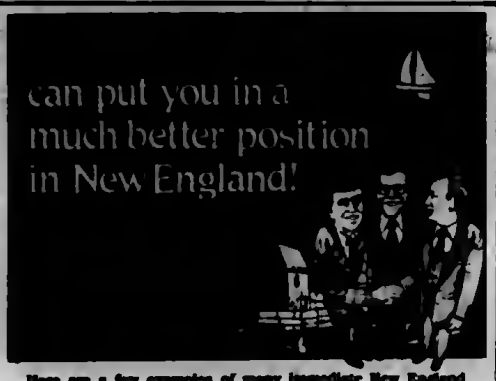


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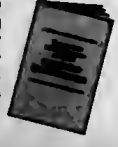

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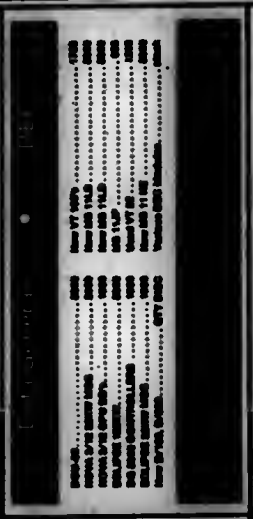

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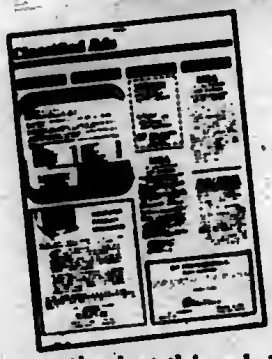

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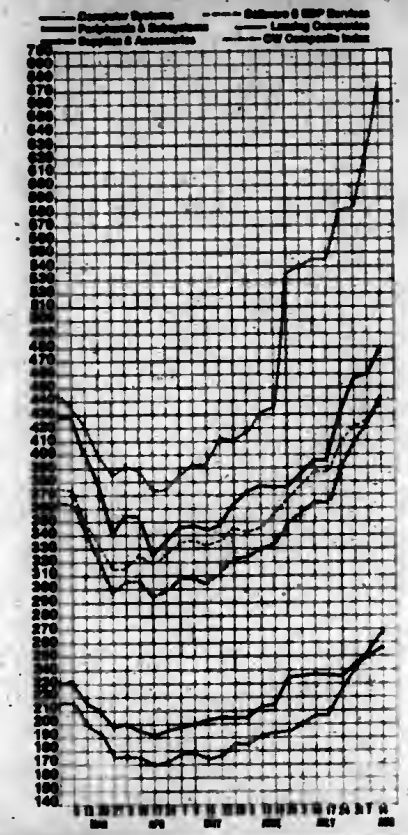


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